2004

The effect of blink on attention capture in web-based design

Lydia M. Naylor
San Jose State University

THE EFFECT OF BLINK ON ATTENTION CAPTURE IN WEB-BASED DESIGN

A Thesis

Presented to

The Faculty of the Department of

Human Factors and Ergonomics

San Jose State University

In Partial Fulfillment

of the Requirements for the Degree

Masters of Science

by

Lydia M. Naylor

December 2004

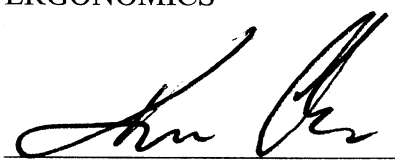
INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

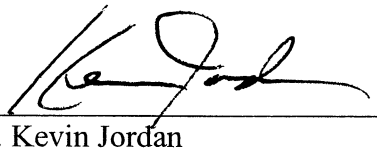
In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

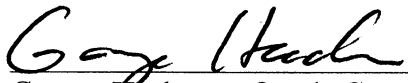
APPROVED FOR THE PROGRAM OF HUMAN FACTORS AND ERGONOMICS



Dr. Kevin Corker

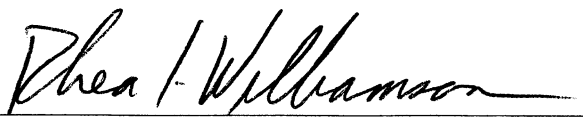


Dr. Kevin Jordan



George Hackman, Oracle Corporation

APPROVED FOR THE UNIVERSITY



ABSTRACT

THE EFFECT OF BLINK ON ATTENTION CAPTURE IN WEB-BASED DESIGN

By Lydia M. Naylor

This study tested the hypothesis that blinking banner ads on Web pages cause a performance decrement in a search result selection task due to their attention-capturing effect. A repeated measures design was employed with banner ad blink rate (0 Hz, 2 Hz and 5 Hz) and color (black & white, and red) as the independent variables. A dual-task methodology with a primary task of selecting search results, and a secondary task of monitoring a stock ticker was utilized to ensure experimental sensitivity.

Overall results of this experiment were not significant, however analysis of the post-study participant questionnaire uncovered a significant Blink x Noticed Ad interaction showing that there is a task time performance decrement for those participants who noticed the blinking ad. These results could be explained by an entraining effect of blink rate. Further testing with Internet users who notice blinking ads should be performed to substantiate these findings.

DEDICATION

This thesis is dedicated to my co-workers at RelayHealth for sharing their time to participate in this study, and to my husband Scott for his never-ending patience, compassion, and support.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

One of the most commonly heard complaints of Internet users is their annoyance with blinking advertisements on Web pages. There are many Web sites that use blinking advertisements as a means of generating income, or attracting the user's attention to other features on the site. While users find this means of advertisement to be annoying, it was the goal of this study to determine whether the presence of blinking advertisements on a Web page actually resulted in a user task performance decrement on specific search tasks.

The number of Internet users and Internet sites has been growing very quickly in the last few years. Nua Internet Surveys reported that in the year 2002 there were an estimated 605 million Internet users world-wide with 183 million users in the United States, alone (Nua, Ltd. 2002). According to Online Computer Library Center, in the year 2002, there were an estimated 3 million publicly accessible sites of the 9 million total Web sites worldwide (Online Computer Library Center, Inc., 2002). Many publicly accessible Web sites employ some sort of advertising, which to many Internet users may seem contrary to their own goals when visiting a site.

The primary goals of the majority of publicly accessible Web site providers are to share information with potential and existing customers, provide a service, or sell products. Additional goals may include drawing the user's attention to the site's advertisements to promote services the site provides, or the services of other advertisers. In some cases, a site provider's income may be derived in part or whole by displaying advertising on the site. A high number of visits – known as "hits" – to an advertiser's site

from the ads on the provider's site is a desired outcome, and thus it may be one of the site provider's goals to attract the user's attention to the ads.

The goals of the user in visiting a site include locating information on the site, or providing information through the site. These goals involve tasks that require a great deal of attention on the user's part such as searching for information, reading technical/procedural documentation, viewing and comparing products for sale, and completing online forms to either purchase products or submit information to the site.

These tasks require the full range of information processing resources: sensory, perceptual, and language processing, comprehension, decision making, response selection and execution, feedback processing and information flow management from thoughts, memories, and visual stimuli. The resource of attention is in high demand from the stages of perceptual processing through to feedback processing where the loop begins again (Wickens, 1992). In this view, the construct of human attention is a limited resource where high attentional demands from some information processing stages will limit the resources available for other stages (Paschler & Johnson, 1998).

Different tasks can be performed in parallel but their efficiency depends partly on the level of available resources (Paschler & Johnson, 1998). The presence of a blinking ad on a Web page may present a distraction to the user whose attentional capacity may already be limited by the tasks necessary to accomplish the goals they had when visiting the site. This distraction may result in a decrease in the user's task performance.

The most popular advertisement formats found on the Internet are called banner ads: rectangular graphics on Web pages that range in size but are typically 1 inch tall by 7 inches wide and appear at the top or bottom of the screen (Zeff & Aronson, 1999). In order to capture the attention of the visitor, sites often use banner ads that employ blinking or moving images, i.e., animated ads, in addition to the use of color. The advertising industry does not differentiate among "animated," "blinking," or "flashing" when it refers to "animated ads." However, for the purpose of this study, only ads that blink – the ads that have two states: "on" and "off," or that cycle through images in a way that the image changes without breaking the flicker fusion threshold – were studied. The flicker fusion rate is defined as the rate, typically between 16 – 20 Hz, at which the presentation of a series of images is perceived as motion (Abramov & Gordon, 1974).

"Animated" banner ads are very popular in use on the Internet because they are relatively inexpensive, small in size, can deliver more information and impact than a static banner, and result in higher click-through rates (defined as the number of times a banner ad is clicked on divided by the number of times the ad is displayed), than static banners (Zeff & Aronson, 1999). However, it should be noted that the click-through rate for banner ads has been dropping, and in 1999 was down from a previously reported level of 2% to only 1% (Zeff & Aronson, 1999). In recent years, the click-through rate on banner ads has declined even more, and has been reported as less than .75% on average (Thomas, 2002; Black, 2001), and as low as .44% in 2004 (iEntry, Inc, 2004).

One of the problems with animated ads is that while these ads may be effective in capturing the user's attention, they are considered to be "annoying" to the point that some

users have reported to have learned to "tune them out" – i.e., they will make a concerted effort to ignore them – or users become frustrated and even emotional when ads are very distracting. Usability professionals such as Nielsen (1999) and Spool (1999) have also made the same observations noting that users "tune out" the advertisement, scroll the ad off the page, or try to cover it while they perform their tasks.

In addition, site providers who in the past tended to avoid placing ads on "transaction pages" – pages where the user is performing a transaction such as providing credit card information to purchase a product, transferring funds between accounts, or buying or selling stock – are now asking how "aggressive" they can be with advertising on these pages without causing too much distraction to their users.

In summary, a conflict exists in which Internet users report that blinking ads on Internet sites are annoying, and Internet sites want to employ these types of advertisements to attract the attention of users. These advertisements employ blink rate and color as a means of capturing the attention of the Web site user, in effect drawing it away from the user's primary task on the Web site. While usability professionals have noted that users do not like blinking advertisements on Web sites, they do not state why they may annoy users. While the annoyance with blinking ad is widely reported, it has not led to a decrease in the use of blinking ads.

It is the hypothesis of this study that the greater the attention capturing effect of the advertisement, the less attentional resources are available to the user to perform their tasks on the site, thus resulting in a decrement in user task performance, i.e., it will cost the user more time and effort to complete their chosen task. In the current study, blink

rate and the use of color in a Web site banner ad were manipulated to investigate the effect of these variables on users' performance of a typical Web site task – locating topics on a search result page that pertained to the user's subject of interest.

CHAPTER 2: BACKGROUND

While no direct study of the hypothesis that blinking ads on a Web page cause a task performance decrement could be found in the literature, there is some supporting information with regard to the general use of valid and invalid highlighting, and its effect on attention capture. Tan and Fisher (1987) defined highlighting validity as highlighting the information in a display that "has a high probability of being the target option." Phillipsen (1994) defined invalid highlighting as the condition in which the distractor, not the target, was highlighted. In the case of this study, the object in the user's field of view that I define as the distractor is the banner ad at the top of the screen, which uses the highlighting techniques of blink rate and color.

Highlighting Techniques of Blink and Color

Studies have been performed in the fields of human factors and psychology to evaluate the use of highlighting, including blink and color to aid in target search tasks. Blink and color are two of the most salient highlighting techniques used in visual design (Fisher & Tan, 1989; Weibe & Howe, 1997; Zwaga & Duijhnouwer, 1995). Of all the highlighting (HL) techniques, color, brightness, and blink were found to aid in visual search tasks most consistently (Tse, 2000).

Color has been found to be one of the best techniques to make a stimulus "pop out" from its surroundings. Evidence suggests that the use of color as a HL tool may have exogenous control over the user's locus of attention (Wolfe, 1998; Marten & Wickens, 1995; Yantis, 1993). In general, color-coding has been found to aid in search tasks

(Zwaga & Duijhnouwer, 1995; Tse, 2000). Movement, including blinking where an object appears to move in time rather than across space, has been cited as enhancing search performance in static distractor displays (Wolfe, 1998). Blink has also been found to improve search performance (Thackray & Touchstone, 1993; Van Orden, Divita & Shim, 1993). The highlighting techniques of color and blink are most often used in banner ads on Web pages where the remaining Web page elements are static.

Not only have the use of blink and color been cited as two of the most salient highlighting techniques for aiding search, but it has been found that on a computer display, when any highlighting is used invalidly, i.e., highlighting something other than the user's intended target, the highlighting can result in longer search times for the target (Donner, McKay, O'Brien and Rudisill, 1995; Tan & Fisher, 1987; Philipsen, 1994). Further, the use of invalid highlighting can result in users having more difficulty finding important information (Thackray & Touchstone, 1991; Van Orden, et al., 1993). These findings can be interpreted to predict that when color and blink are used in Web site advertisements, they will draw the attention of the user away from the tasks they are trying to perform. This can be defined as invalid highlighting since the advertisement is seen as the distractor and not the intended target of the user.

In addition, invalid highlighting can result in the difficulty or delay of processing other information such as in the case where two separate elements are present (as in the case of this study, an ad and a listing of search results). It may be difficult for the user to completely focus on one when there is competition from the other element for processing resources (Treisman, Kahneman & Burkell, 1983). If the distractor is close to the target,

the distractor will cause interference in attention, and when the distractor is possbily more salient, such as in the case of a highlighted distractor, the interference may be more pronounced.

While the studies cited above support the hypothesis that using invalid highlighting will result in a performance decrement, they were all performed with simple stimuli, e.g., blinking digits in a 5-digit array (Tan & Fisher, 1987), flashing colored shapes (Van Orden, et al, 1993), flashing and colored radar targets (Thackery & Touchstone, 1993), etc. It can be postulated that performing tasks on a Web site is more complex than looking for a single target in a field of distractors that are different from the target in only a few dimensions. It can be hypothesized that it involves more cognitive capacity to perform tasks such as reading search results and deciding which are relevant to the search topic. The current anecdotal evidence states that users are annoyed by Web site advertisements. Knowing whether blinking ads cause a performance decrement would be more useful to Web designers in making them aware of how these advertisements affect the ability of their users to efficiently and effectively use their sites.

The Present Study

The main purpose of this study was to investigate whether the presence of a blinking ad on a Web page would result in a task performance decrement. Blink rate and the use of color in a Web site banner ad were manipulated to investigate the effect of these variables on users' performance of a typical Web site task – locating topics on a search result page that pertained to the user's subject of interest.

Based on observations in the field of Web site usability testing, and findings in human factors and psychology research as referenced previously, the following hypotheses were tested in this study:

Hypothesis 1. Speed and accuracy of selecting search results on a Web page with a blinking banner ad will be less than that on a page with a static banner ad.

Hypothesis 2. Increased frequency of the blinking ad will result in a further decrease in speed and accuracy of selecting search results.

Hypothesis 3. The addition of an ancillary attention mechanism to the ad such as color will result in a greater decrease in speed and accuracy than just blink rate alone.

While there are other factors involved in Web site advertising such as the use of 3D images, sound, animation, and the saliency of message content, these factors are outside the scope of this study. This study researched the effects of blink rate and color, which have been found to affect pre-attentive processes. Message content involves cognitive and emotional processes and not purely perceptual/attentional processes, and so were not studied.

CHAPTER 3: METHOD

Design

To investigate these hypotheses, a repeated measures design was employed with blink rate and color as the independent variables. A dual-task methodology was used to ensure sensitivity of the experiment. It included the primary task of selecting search results from a list, and the secondary task of monitoring a continuous stock ticker display for changes in target values. The dependent variables measured were task time and accuracy of selecting search results, and accuracy of monitoring the stock ticker.

There were three levels of blink rate: no blink (0 Hz), moderate blink (2 Hz blink: 250 ms on, 250 ms off), and fast blink (5 Hz blink: 100 ms on, 100 ms off). The blink rates for this study were determined by visiting popular Internet sites and measuring the blink rates of the banner ads that appeared. In addition, Tullis (1988) recommended the best flashing frequencies on computer screens to be between 2 – 5 Hz, noted that they only be used to convey urgency of the information as they can annoy the user and may reduce legibility of the message, and the user interface should allow the user to stop the blinking. Smith and Goodwin (1971) recommended cursor blink rates to be presented at a frequency of 3 Hz to capture the user's attention.

In this study, it was also hypothesized that the addition of a highly salient color to the advertisement would result in a further decrease of participants' speed and accuracy in performing the tasks than when the ad was only black and white. There were two levels of color: black and white (white text on black background), and color (red text on a

black background). Red was chosen for the color condition because it has a tendency to pop-out from its surroundings more than most other colors (Galitz, 1988). In addition, according to Lalomia and Happ (1987), who established effective color combinations for a color display, red or magenta on a black background was rated as a good combination. They defined color combination effectiveness by the parameters of user response time to identify characters and subjective preferences of users. "Good" color combinations were those that ranked in the top 20% of the color combinations studied for overall effectiveness.

The design of the task was intended to emulate a situation a user would normally encounter when using the Internet: selecting search results to find information. Participants performed a practice task trial with a non-blinking black and white ad. They then performed 6 search task trials, each with a different banner ad combination of the color and blink factors. Both the banner ads and the search result tasks were counterbalanced in presentation. Participants took a 1-minute break between trials. Table 1 shows a simplified diagram of the study design. The complete order of banner ad/search result presentations for each subject can be found in Appendix A.

The first step of each trial was a presentation of a question, for example, "When is high tide in the San Francisco Bay today?" Participants were then presented with a list of 30 search results and asked to select the ones that would most likely lead them to answer the question. The search results were taken from Google.com and Altavista.com from April to July 2003. Topics where chosen and search results were manipulated to ensure that the participant would be able to make a reasonable judgment about each result's fit to

the question. Some results were edited to clarify their content such as inclusion of dates, or lengthening of the description from the actual site. Each list of search results had an approximate target to distractor ratio of 1:1, i.e., there was an equal number of targets and distractors per list. The search results included well-known current topics and general interest topics. A complete listing of all 7 search result lists can be found in Appendix B.

The search result task required participants to read each search result (which involves perception, language processing, and comprehension), and decide whether or not it would lead them to answer a posed question (decision making). Participants made their selections by checking a check box next to each search result (response selection and execution). This task involved the full range of information processing resources, which would put a high demand on attentional resources as postulated in the introduction.

In order to measure the effect of the two independent variables of blink and color, and ensure the sensitivity of the experiment, a dual-task methodology was employed. The primary task was the selection of appropriate search results on the Web page as described above. The secondary task was the simultaneous monitoring of a continuous stock ticker display for a specific change. This task required participants to sample the stock ticker display (perception), and determine whether or not the number increased (language processing, comprehension and decision-making). When the stock ticker showed an increase in the Dow Jones Industrial Average, the participant was required to click a button (response selection and execution). As in the primary task, this task involved the full range of information processing resources, putting a high demand on attentional resources.

Participants were instructed to perform both tasks simultaneously as quickly and accurately as they could, paying close attention to their selection of appropriate search results. The dependent variables were speed in performing the search results task, accuracy in finding and selecting the appropriate search results, and accuracy in monitoring the stock ticker display.

Table 1

Sample Presentation of Banner Ads and Search Result Exercises for a Participant

Participant	Banner Ad	Search Task
1	Black & white / no blink	When is low tide in the SF Bay today?
	Black & white/ moderate blink	How do you sharpen a knife?
	Black & white / fast blink	What is the origin of Labor Day?
	Color / no blink	What is the current unemployment rate?
	Color / moderate blink	What was the latest US census population?
	Color / fast blink	What is the US $/Euro exchange rate today?

Apparatus and Materials

The apparatus used in this study consisted of a computer system and monitor, a series of Web pages, and a data file to record keystrokes. Additional materials consisted of a participant screening questionnaire, moderator script, participation agreement, post-study questionnaire, and debriefing statement.

The testing system consisted of a Pentium computer with a 17-inch color monitor. The monitor was set at a screen resolution of 1024 x 768 pixels at a refresh rate of 75 Hz. The viewing distance between the participant and the monitor was fixed at approximately 19 inches. This distance was chosen according to the recommendations of Smith and Cohen (1997) who recommended the viewing distance to be between 18 to 19 inches and not exceed 24 inches.

For each task, the participant was exposed to 3 Web pages. The page flow is depicted in Figure 1. The first page presented was the study home page (see Figure 2 for details) and had a link to each of the 7 trials labeled as exercises (1 practice trial, and 6 test trials presented in a counterbalanced combination of banner ads and search result exercises). Clicking an exercise link on the study home page led to the instruction page for the respective exercise (see Figure 3). The instruction page displayed the question the participant would be asked to answer when selecting search results, and a "Start" link. By clicking the "Start" link, the participant's start time was recorded in a data file and the participant was presented with the exercise page containing the search results and stock ticker display (see Figure 4). On the exercise page, the search result selection and time it

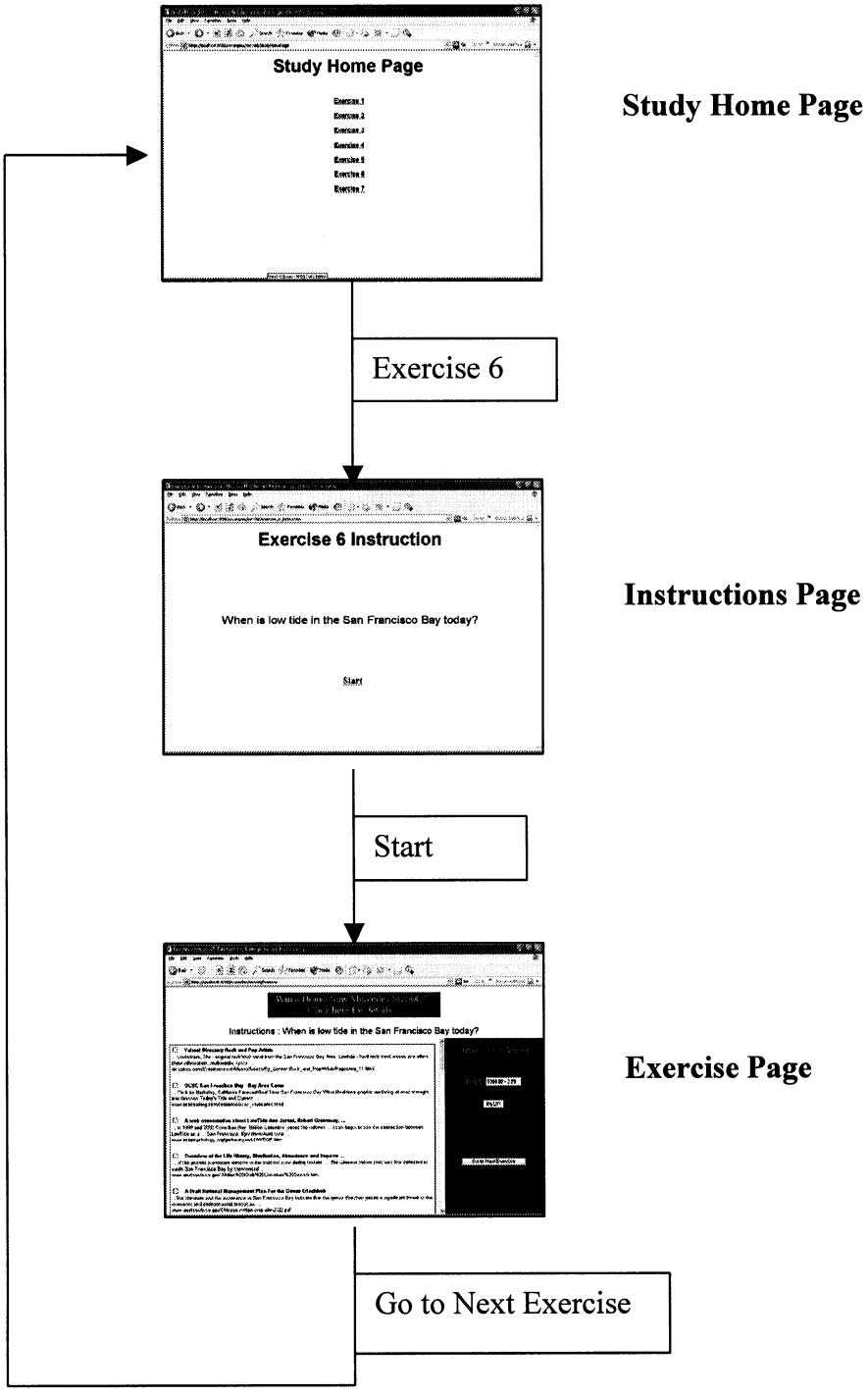


Figure 1. User interface map of 3 page flow for each test trial.

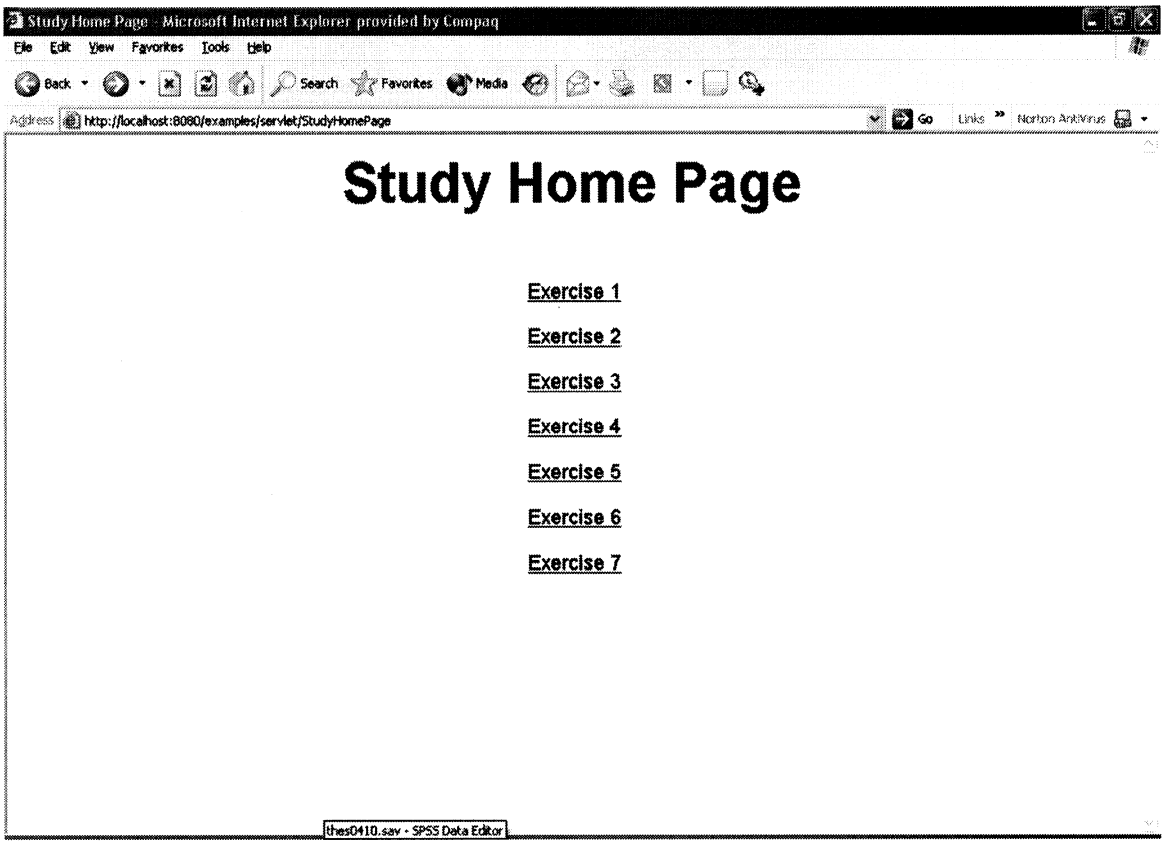


Figure 2. The study home page was the first page presented to each participant. The link labeled Exercise 1 led to the practice trial, and was the first trial performed by all participants. After the practice trial, participants returned to the study home page and the moderator instructed them as to which link to click next. The order of the remaining trails was counterbalanced for each participant.

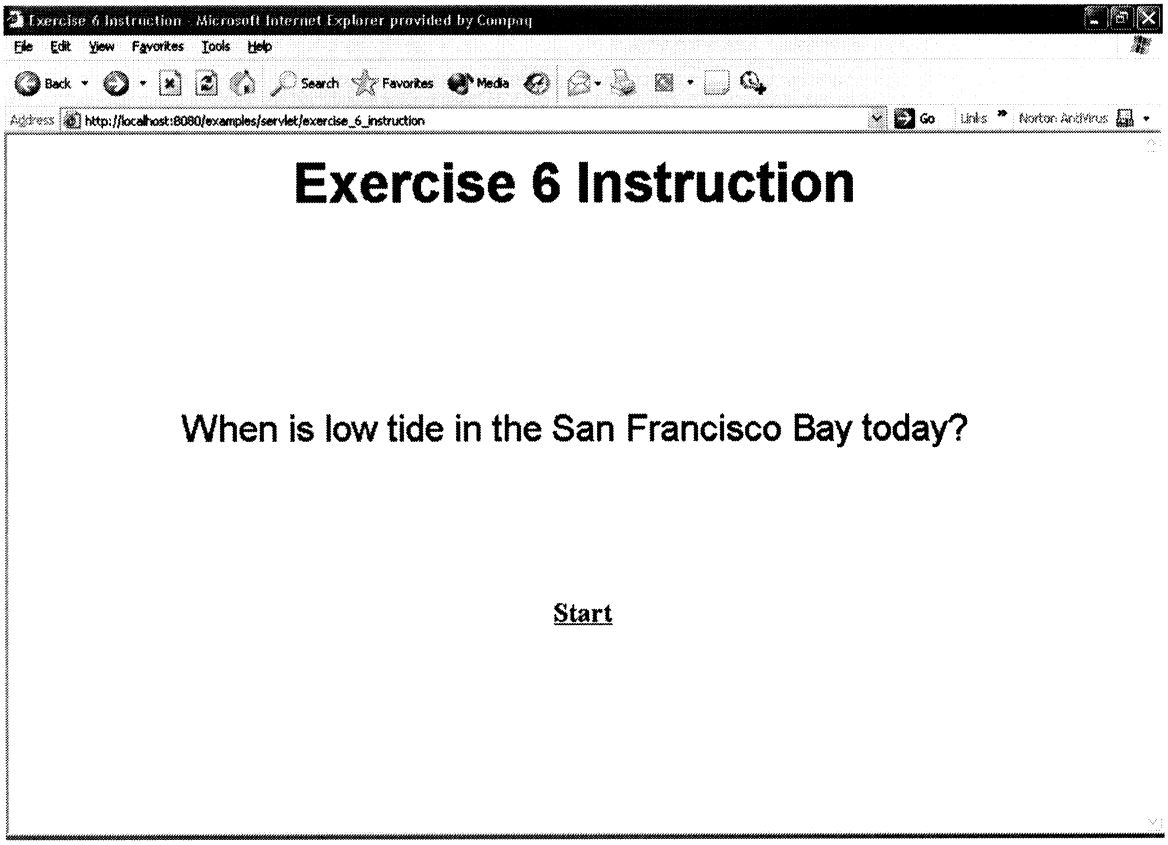


Figure 3. The instruction page resulted from clicking on an exercise link on the study home page. Each exercise had its own instruction page. When the participant clicked the "Start" link, the time was recorded in a data file, and they were taken to the appropriate exercise page.

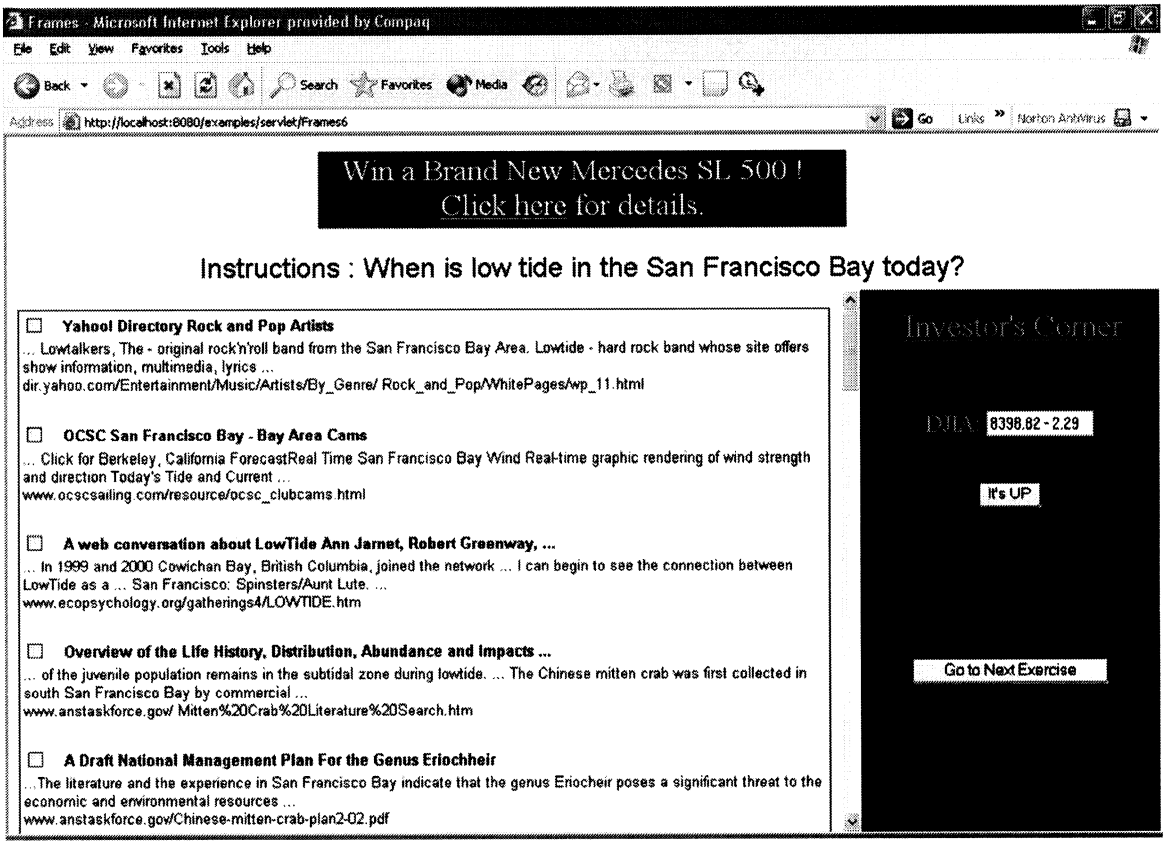


Figure 4. The exercise page consisted of three frames: the ad frame at the top, the primary task frame below it containing the search results, and the secondary task frame on the right containing the Dow Jones Industrial Average ticker. The task instructions were repeated from the previous Web page to serve as a reminder for the participant.

was clicked were recorded in a data file along with the presentation history of the ticker and the value of the ticker when the participant clicked the "It's Up" button. A sample of the data file can be viewed in Appendix C. At the end of each trial, the participant returned to the study home page and took a 1-minute break before starting the next trial.

The exercise Web page design (Figure 4) adhered to the most common Web page design guidelines for size and placement of the advertisement (Interactive Advertising Bureau, 2003; NetRatings, Inc., 2003). The banner ad was 468 x 68 pixels in size and was placed at the top of the exercise page. The content of the banner ad was the same for all task presentations and read, "Win a brand new Mercedes SL 500! Click here for details."

The stock ticker display was 250 x 500 pixels in size and was placed on the right side of the screen. The stock ticker display had a black background and showed the Dow Jones Industrial Average (DJIA) in a white text box with black text. This color combination was chosen for maximum contrast so that participants would be able to locate and read the display. The text showed the DJIA, and next to it the positive or negative change, e.g., 8213.25 +.2.29. The number of updated presentations of the DJIA followed a forcing function: the ticker updated 5 times at random intervals in a 30 second period. The participant clicked on the "It's Up" button when they saw that the number in the ticker display had increased. The history of each change in the ticker display and the participant's button clicks were recorded in the data file.

In order to facilitate the ad and stock ticker being within the participants' view during the task, the exercise page was divided into frames with the ad, the search results,

and the stocker ticker display in their own frames. To view all the results, the participant was able to scroll through the search results without moving the ad or the stock ticker display out of view. The participant checked the boxes of the appropriate search results by clicking the mouse in the checkbox next to each search result. The search result selection and time it was clicked were recorded in a data file. When the participant was done selecting the appropriate search results, they clicked the "Done with Search Results" button at the end of the search results frame, which recorded the end time of the trial. They then clicked the "Go to Next Exercise" button to return to the study home page.

Each participant was screened before the study session to ensure his or her fit to the participant profile for the study. The study screener (see Appendix D) was administered verbally by the moderator, and collected information including the participant's gender, age, vision, and Internet usage and experience.

A study briefing and instructions script (see Appendix E) was used by the moderator to ensure that all participants received the same instructions during the study. After the participant was briefed about the study, he or she was asked to sign an agreement to participate in research (see Appendix F), and was then verbally given the pre-task instructions found in the script.

At the end of the study session, the moderator verbally administered a post-study questionnaire to each participant (see Appendix G) and had each one sign a debriefing statement disclosing the true purpose of the study (Appendix H). The post-study questionnaire fulfilled 3 main purposes: to measure how difficult or easy participants felt

it was to perform both tasks (selecting search results and monitoring the stock ticker) simultaneously, to elicit any feedback the participants might have had about the ads, and to find what they normally did when presented with a blinking ad. All ratings utilized a 7-point scale. To further ensure the sensitivity of the study, the subjective measure of participants' perception of task difficulty was used to ensure that performing both tasks actually did place a high demand on participants' attentional resources. The questions about the ads – what they thought about the ads, and what they normally do when presented with a blinking ad – helped to measure if they noticed the ads during the study session, and to compare the findings of this study with those of Nielsen (1999) and Spool, et al (1999) noted in the introduction.

Participants

Thirty-four adults between the ages of 25 and 50, with normal or corrected-to-normal vision participated in this study.[1] There were 18 males and 16 females. Participants were screened for participation using the study screener in Appendix D. All participants were experienced Internet users and used the Internet on a daily basis. An experienced Internet user was defined as someone who had used the Internet for at least 1 year on at least a weekly basis, and had purchased products online, and performed searches with a search engine (Inter Commerce Corporation, 2002). The majority of participants in this study (77%) had used the Internet for more than 7 years, and (82%) had spent more than 10 hours a week on the Internet.

[1] The original sample contained 36 participants, however the results of two participants were excluded from the analyses because they did not follow directions consistently throughout the experiment.

The participants took part in the study voluntarily and without compensation. The Human Subjects-Institutional Review Board process was followed to ensure proper treatment of the participants throughout the study session. A copy of the Human Subjects – Institutional Review Board approval for this study can be found in Appendix I.

Procedure

Each participant was brought to the test room that contained the test system and monitor. The same room and moderator were used for all participants. The moderator then screened each participant using the study screener in Appendix D, which contained questions about the participant's gender, age, vision, and Internet usage and experience. Once the participant was determined as a good fit for the study, they were then briefed about the study including an overview of what they would be doing, and how to interact with the moderator. They were told that the study was investigating the effects of performing two tasks simultaneously. The moderator then explained and had the participant sign an agreement to participate in research.

After the briefing, each participant was shown a paper mock-up of the three pages (the study home page, a sample instruction page, and an exercise page) and instructed on what to do on each page. They were instructed to clarify with the moderator any questions they had about an exercise on its instruction page before clicking the "Start" link.

Participants were instructed to view the exercise page containing the search results and to select the search results that best matched what they were asked to find (primary task). In addition to the search task, the participants were asked to simultaneously

monitor the Dow Jones Industrial Average stock ticker, and click the "It's Up" button each time the average increased (secondary task). Participants were instructed to try their best to perform both tasks simultaneously while placing more emphasis on the primary task. Employing the secondary task ensured that the participant's attentional capacity was engaged at a high level, and that the experimental design was sensitive enough to measure the effects of the independent variables (blink rate and color) on the dependent variables (speed and accuracy) of the primary task, and (speed) the secondary task. When they were finished selecting the search results, participants were told to click the "Done with Search Results" button at the bottom of the search results frame and click the "Go to Next Exercise" button to return to the study home page.

Next the participant performed the practice trial on the test system. All participants received the same practice instructions and test trial. At the end of the practice trial, the moderator clarified any questions the participants had without biasing them in any way. Once it was clear that the participant understood how to perform the tasks, they were instructed to begin the next exercise. The remaining 6 trials were counterbalanced in presentation to each participant.

Once the participant finished all the trials, the moderator verbally administered the post-study questionnaire to the participant (see Appendix G). Finally, each participant was debriefed as to the true purpose of the study and asked to sign a debriefing statement (see Appendix H).

CHAPTER 4: RESULTS

Web Page Data

Separate two-factor within-subjects analyses of variance were conducted to evaluate the effect of blink rate and color on speed and accuracy of selecting search results, and accuracy in monitoring a stock ticker display on the Web page. The within-subjects factors were blink rate with three levels (no blink: 0 Hz, moderate blink: 2 Hz, and fast blink: 5 Hz), and color with two levels (black and white: white text on black background, and color: red text on a black background). The dependent variables were speed measured by task time, and accuracy measured by search result score and stock ticker score.

Task time was defined as the time it took the participant to select all the search results on the page and was measured from the time the participant clicked the "Start" link on the instruction page to the time they clicked the "Done with Search Results" button on the bottom of the search results frame of the exercise page. The search result score was calculated as the sum of the hit rate (number of correct selections) and the correct rejection rate. The ticker score was calculated as the ratio of the sum of the hit rate and correct rejection rate, less duplicates to the total number of ticker events. An alpha level of .05 was used for all statistical tests unless otherwise noted.

Task Time

The overall analysis for task time revealed a non-significant main effect for blink rate ($F(2,66) = 2.16$, $p > .05$), a non-significant main effect for color ($F(1, 33) = 1.93$, $p > .05$), and a non-significant Blink Rate x Color interaction ($F(2, 66) = .15$, $p > .05$), showing that there were no effects of blink rate or color on task time (see Table 2 for the mean task times and Figure 5 for the graph of the interaction).

A paired-samples t test was conducted to assess the differences for task time between the mean in minutes of the no blink condition ($M = 3.04$) and the combined means of the moderate and fast blink conditions ($M = 3.14$) collapsed across color. This analysis revealed a non-significant difference, $t (33) = 1.31$, $p > .05$, showing that there was no significant difference in task time between the no blink condition and the combined blinking conditions.

Finally, trend analyses were conducted on the main effect of blink rate to assess the effects of an increase in blink rate on task time. The trend analysis for task time revealed no linear trend, $F(1, 33) = .16$, $p > .05$, showing that an increase in the blink rate from no blink to moderate to fast blink did not result in increase in task time.

Table 2

Mean Task Times in Minutes for Blink Rate by Levels of Color

	No Blink (0Hz)			Moderate Blink (2 Hz)			Fast Blink (5 Hz)		
Color	M	SD	n	M	SD	n	M	SD	n
Black and White	3.06	.95	34	3.25	1.12	34	3.15	1.08	34
Color	3.01	.93	34	3.18	1.02	34	2.99	1.03	34

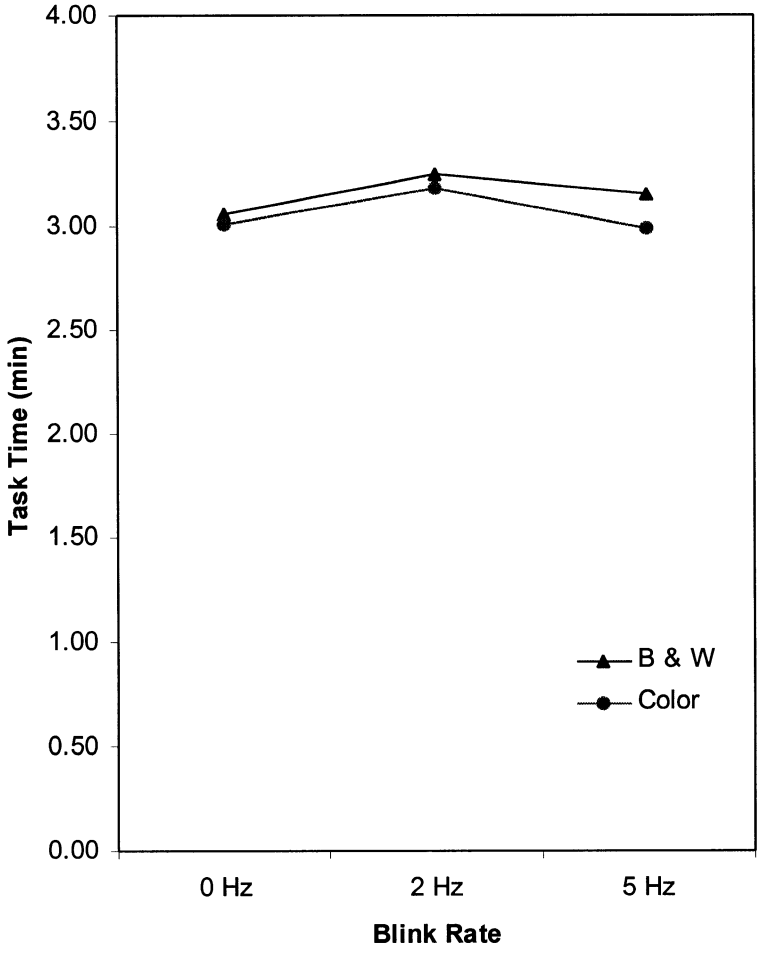


Figure 5. The Blink x Color interaction for task time. The interaction was not significant, $F(2, 66) = .15$, $p > .05$.

Search Result Score

The overall analysis for search result score also revealed a non-significant main effect for blink rate ($F(2, 66) = .22$, $p > .05$), a non-significant main effect for color ($F(1, 33) = 1.97$, $p > .05$) and a non-significant Blink Rate x Color interaction ($F(2, 66) = .00$, $p > .05$) showing that there were no effects of blink or color on search result score (see Table 3 for the mean search result scores and Figure 6 for a graph of the interaction).

A paired-samples t test was conducted to assess the differences for search result score between the mean of the no blink condition ($M = .80$) and the combined means of the moderate and fast blink rate conditions ($M = .79$) collapsed across color. This analysis revealed a non-significant difference, $t(33) = -.65$, $p > .05$, showing that there was no significant difference between the search result scores in the no blink condition compared to the blinking conditions.

Finally, trend analyses were conducted on the main effect of blink rate to assess the effects of an increase in blink rate on search result score. The trend analysis for search result score revealed no linear trend, $F(1, 33) = .66$, $p > .05$, showing that an increase in blink rate from no blink to moderate to fast blink did not result in a decrease in search result score.

Table 3

Mean Search Result Scores for Blink Rate by Levels of Color

	No Blink (0Hz)			Moderate Blink (2 Hz)			Fast Blink (5 Hz)		
Color	M	SD	n	M	SD	n	M	SD	n
Black and White	.79	.11	34	.79	.10	34	.78	.13	34
Red	.81	.09	34	.81	.10	34	.80	.10	34

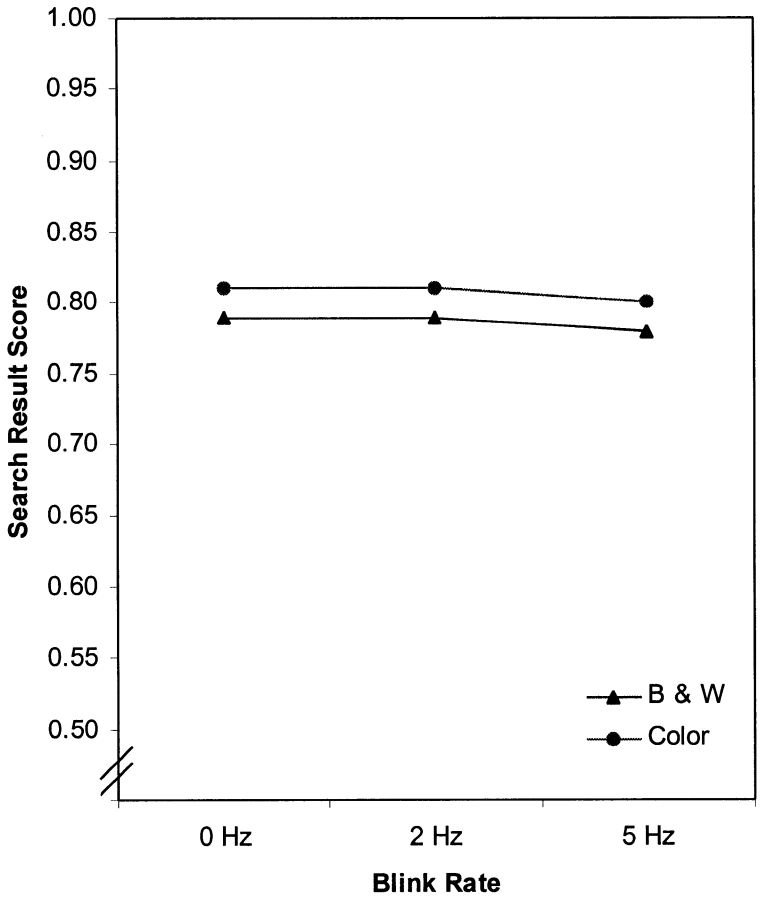


Figure 6. The Blink x Color interaction for search result score. The interaction was not significant, $F(2, 66) = .00$, $p < .05$.

Ticker Score

The overall analysis for ticker score also revealed a non-significant main effect for blink rate ($F(2, 66) = 1.06$, $p > .05$), a non-significant main effect for color ($F(1, 33) = .56$, $p > .05$), and a non-significant Blink Rate x Color interaction ($F(2, 66) = .50$, $p > .05$) showing that there were no effects of blink or color on ticker score (see Table 4 for the mean ticker scores, and Figure 7 for a graph of the interaction).

A paired-samples t test was conducted to assess the differences for ticker score between the mean of the no blink condition ($M = .77$) and the combined means of the moderate and fast blink rate conditions ($M = .75$) collapsed across color. This analysis revealed a non-significant difference, $t(33) = 1.19$, $p > .05$ showing that there was no significant difference between the ticker scores in the no blink condition compared to the blinking conditions.

Finally, trend analyses were conducted on the main effect of blink rate to assess the effects of an increase in blink rate on ticker score. The trend analysis for ticker score also revealed no linear trend, $F(1, 33) = .59$, $p > .05$, showing that an increase in blink rate from no blink to moderate to fast blink did not result in a decrease in ticker score.

Table 4

Mean Ticker Scores for Blink Rate by Levels of Color

	No Blink (0Hz)			Moderate Blink (2 Hz)			Fast Blink (5 Hz)		
Color	M	SD	n	M	SD	n	M	SD	n
Black and White	.77	.10	34	.74	.10	34	.75	.10	34
Red	.76	.10	34	.75	.10	34	.76	.11	34

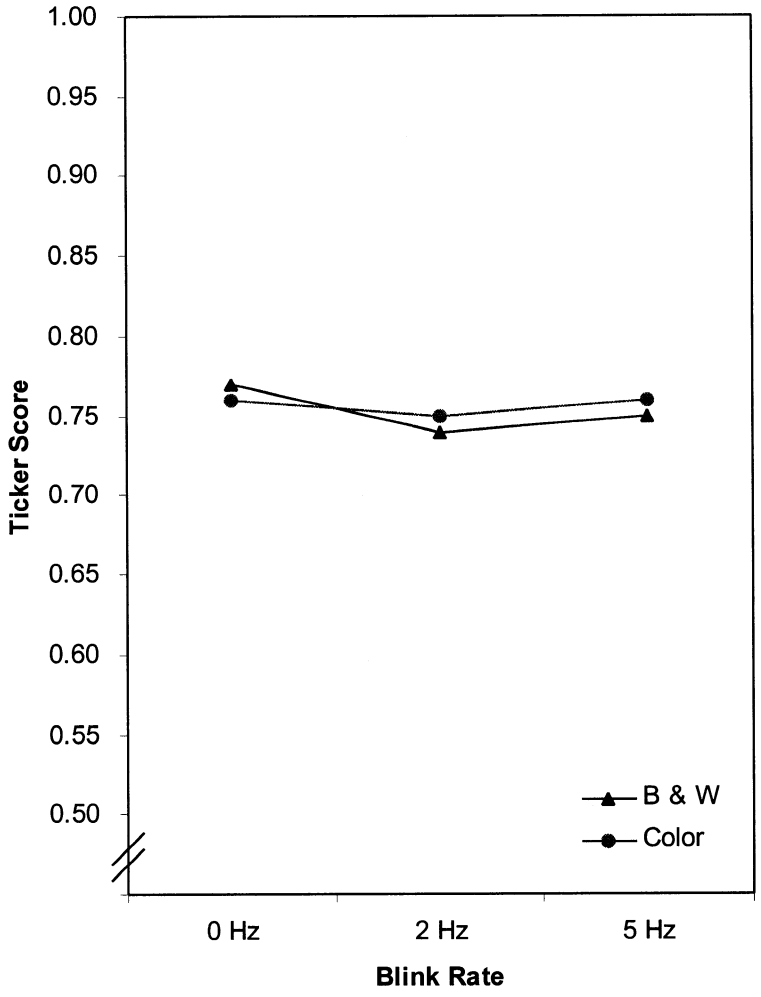


Figure 7. The Blink x Color interaction for ticker score. The interaction was not significant, $F(2, 66) = .50$, $p < .05$.

Post-Study Questionnaire Data

Using a 7-point scale, with 1 being extremely difficult and 7 being extremely easy, participants' mean rating for the ease of performing both tasks was 3.64 (SD = 1.10). The majority of participants (68%) rated performing both tasks as "somewhat difficult" or "extremely difficult." This could be interpreted as giving support to the difficulty of the design of the study, and the goal of placing a high demand on participants' attentional resources. Figure 8 shows the bar graph for this data.

When asked how they felt about the banner ad at the top of the Web page, 59% (20 of 34) stated that they never noticed an ad, and 41% (14 of 34) stated that they did notice the ad. On a 7-point scale, with 1 being extremely disliked and 7 being extremely liked, the mean rating for the banner ad at the top of the page for the participants who noticed the ad was 2.86 (SD = 1.29). The bar graph of the scores can be viewed in Figure 9. To see if the noticed ad factor may be causing the task time differences, a 3-way ANOVA was run with the independent variables of noticed ad, color and blink for the dependent variable of task time. Note that Mauchly's Tests of Sphericity were non-significant so sphericity (the covariances were homogeneous) was assumed for all tests. See Table 5 for a full listing of the analysis.

The Noticed x Color x Blink interaction was not significant at the alpha level of .05, $F(2, 64) = 1.06$, $p > .05$. (See Table 6 for the mean task times, and Figures 10 and 11 for a graph of the interaction.) Of the 2-way ANOVAs, only the Noticed x Blink interaction was significant, $F(2, 64) = 3.13$, $p < .05$. (See Table 7 for the mean task times, and Figure 12 for a graph of the interaction). The Bonferroni procedure with an alpha

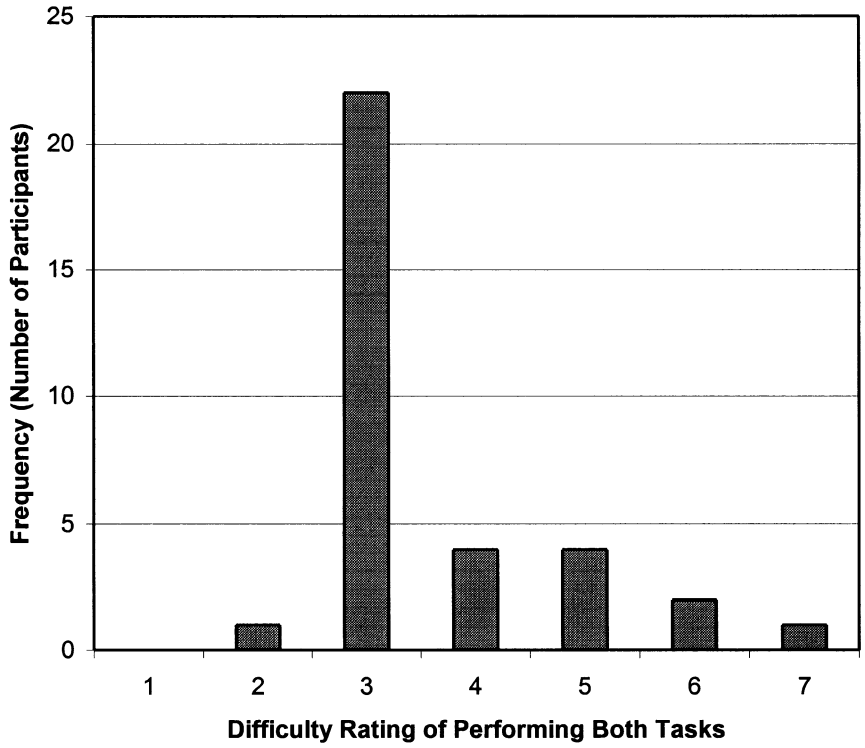


Figure 8. Participants' rating of the difficulty of performing both tasks (selecting search results and monitoring the ticker display) using a 7-point scale. All points on the scale were labeled. The first point was labeled "Extremely Difficulty" and the 7th point was labeled "Extremely Easy." The complete questionnaire can be found in Appendix G.

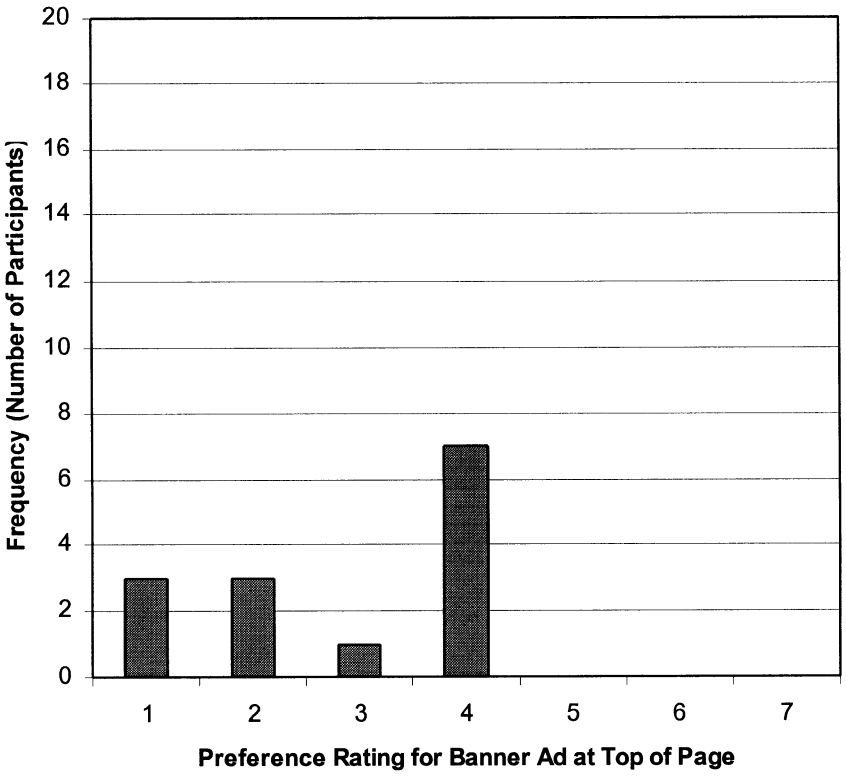


Figure 9. Participants' (who noticed) rating of the banner ad at the top of the Web page during the study on a 7-point scale. All points on the scale were labeled. The first point was labeled "Extremely Disliked It" and the 7th point was labeled "Extremely Liked It." The complete questionnaire can be found in Appendix G.

Table 5

Data Analysis of 3-Way ANOVA of Noticed Ad x Color x Blink Rate for Task Time

Test	Alpha Level	Results
Noticed x Color x Blink	.05	$F(2,64) = 1.06$, $p > .05$
Color x Noticed	.05	$F(1,32) = 2.38$, $p > .05$
Color x Blink	.05	$F(2, 64) = .31$, $p > .05$
Color	.05	$F(1,32) = .2.79$, $p > .05$
Noticed	.05	$F(1,32) = .1.30$, $p > .05$
Blink	**.05**	**$F(2, 64) = 3.25$, $p < .05$**
Comps: 0 to 2 Hz	.0167	$t = -1.73$, $df = 33$, $p > .0167$
Comps: 2 to 5 Hz	.0167	$t = 1.62$, $df = 33$, $p > .0167$
Comps: 0 to 5 Hz	.0167	$t = -.40$, $df = 33$, $p > .0167$
Blink x Noticed	**.05**	**$F(2,64) = 3.12$, $p < .05$**
Simple effects: Blink at No	.0167	$F(2, 38) = .02$, $p > .0167$.
Simple effects: Blink at Yes	.0167	$F(2,26) = 3.26$, $p > .0167$
Simple effects: Noticed at 0Hz	.0167	$F(1,32) = .31$, $p > .0167$
Simple effects: Noticed at 2Hz	.0167	$F(1,32) = 3.17$, $p > .0167$
Simple effects: Noticed at 5Hz	.0167	$F(1,32) = .70$, $p > .0167$.

Note. An alpha level of .05 was used to test all interactions and main effects. An alpha level of .0167 was used to test all pairwise comparisons and simple effects as per the Bonferroni procedure. Only the main effect of Blink and the Blink x Noticed interaction were significant.

Table 6

Mean Task Times for Noticed Ad by Color by Blink Rate

		No Blink (0Hz)			Moderate Blink (2 Hz)			Fast Blink (5 Hz)		
Noticed	Color	M	SD	n	M	SD	n	M	SD	n
No	Black & White	2.98	.96	20	3.01	1.04	20	2.92	.88	20
	Red	2.96	1.07	20	2.93	1.05	20	2.99	1.15	20
Yes	Black & White	3.19	.97	14	3.61	1.17	14	3.49	1.29	14
	Red	3.08	.75	14	3.54	.89	14	2.98	.89	14

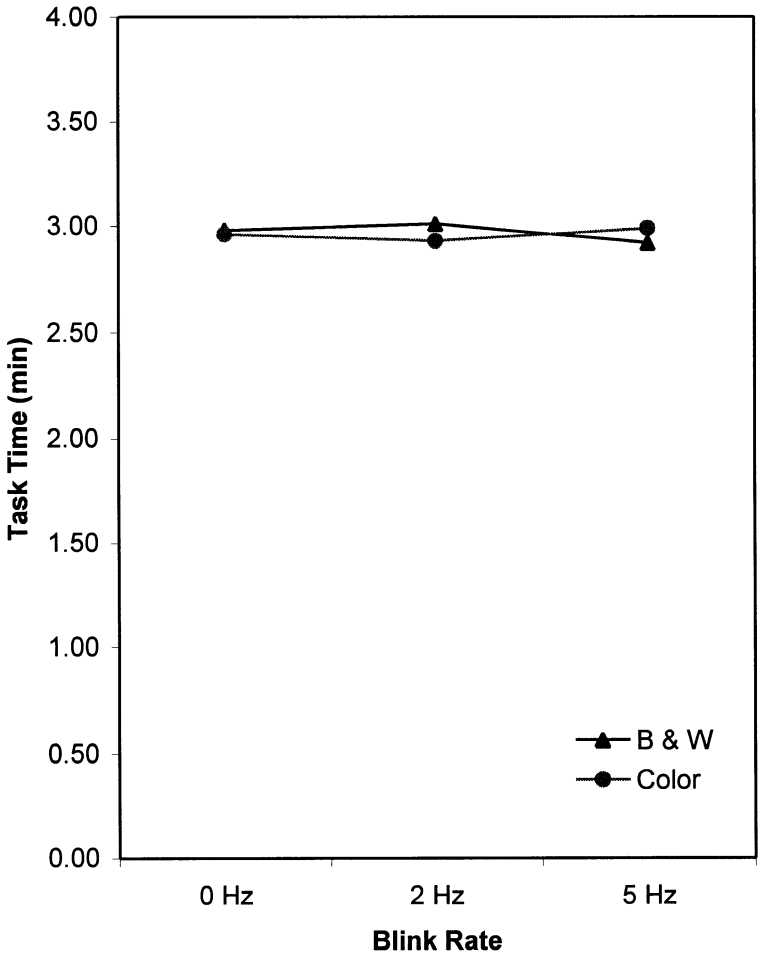


Figure 10. The Blink x Color x Noticed interaction: Part 1. This graph shows Blink and Color factors for the no level of the Noticed Ad factor. The Blink x Color x Noticed interaction was not significant, $F(2, 64) = 1.06$, $p > .05$.

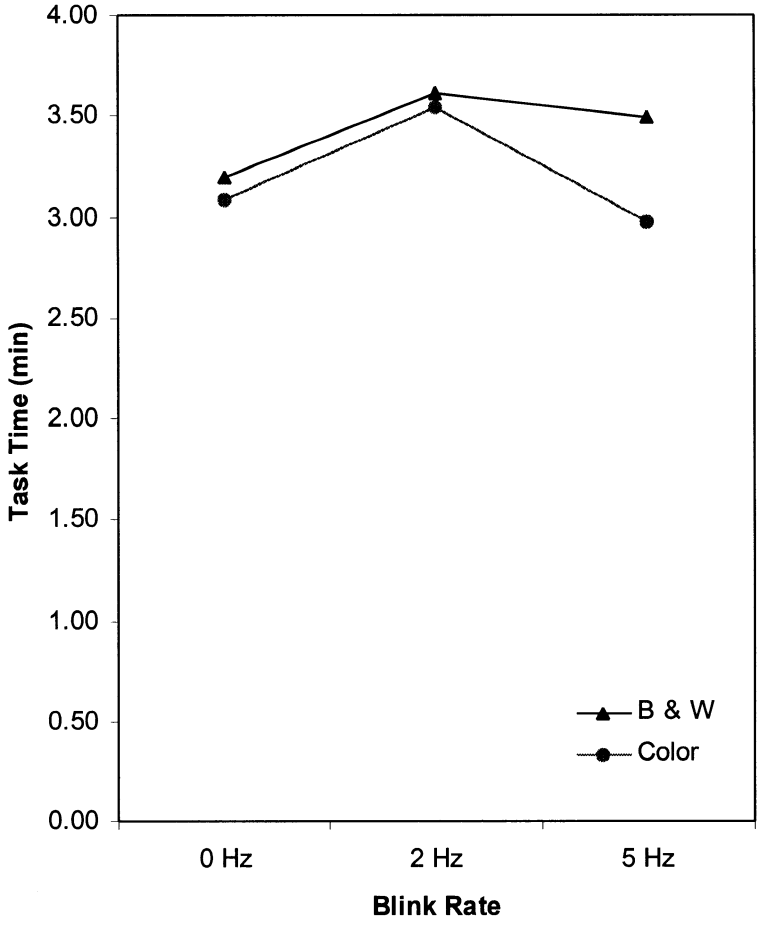


Figure 11. The Blink x Color x Noticed interaction: Part 2. This graph shows Blink and Color factors for the yes level of the Noticed Ad factor. The Blink x Color x Noticed interaction was not significant, $F(2, 64) = 1.06$, $p > .05$.

Table 7

Mean Task Times for Blink Rate by Levels of Noticed Ad

	No Blink (0Hz)			Moderate Blink (2 Hz)			Fast Blink (5 Hz)		
Noticed Ad	M	SD	n	M	SD	n	M	SD	n
No	2.97	.97	20	2.97	1.00	20	2.95	.10	20
Yes	3.13	.67	14	3.58	.95	14	3.23	.93	14

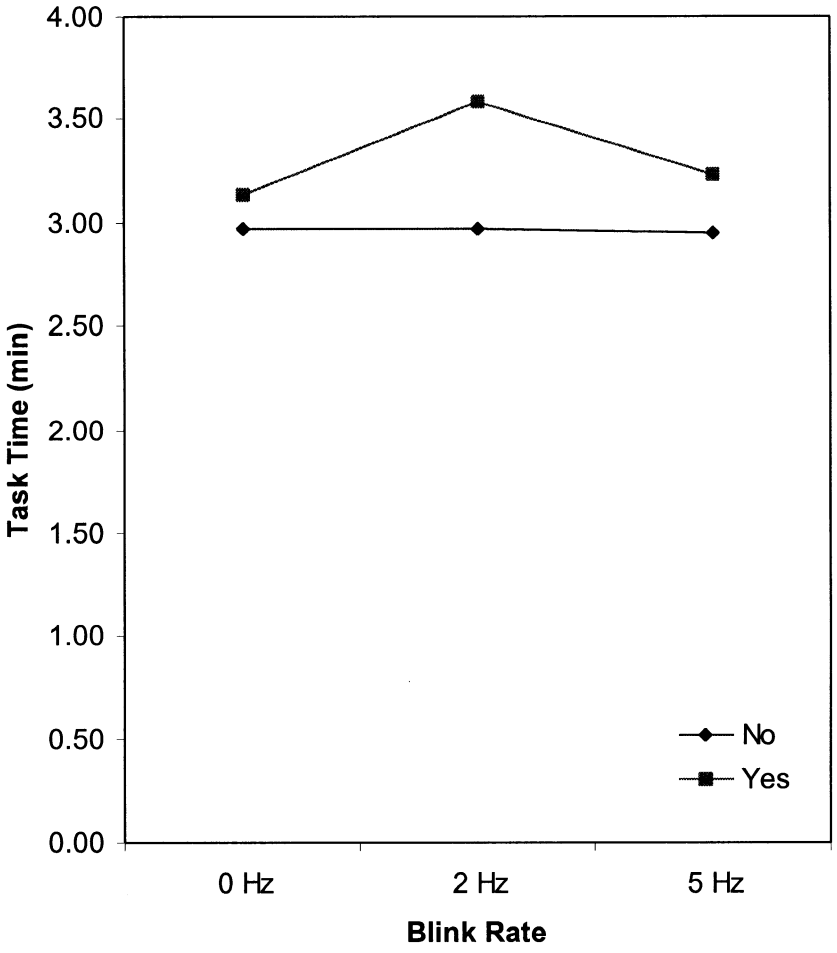


Figure 12. The Blink x Noticed interaction for task time. At the .05 level, the interaction was significant, $F(2, 64) = 3.12$, $p < .05$.

level of .0167 was used to analyze the simple effects of the blink factor at both the no level of the noticed factor (did not noticed the ad) and the yes level (did notice the ad). The simple effects of blink at the no level uncovered a non-significant effect, $F(2,38) = .02$, $p > .0167$. While the simple effect of the blink factor at the yes level also uncovered a non-significant effect, $F(2, 26) = 3.26$, $p > .0167$, it appears that something is affecting task time when participants notice the ad.

Since the remaining 2-way ANOVAS were not significant at the .05 level, ($F(1,32) = 2.38$, $p > .05$ for the Color x Noticed interaction, and $F(2,64) = .31$, $p > .05$ for the Color x Blink interaction), the main effects of the noticed ad, color and blink factors were analyzed (See Tables 8 – 10 for the mean task times.) The main effects of color and noticed factors were not significant at the .05 level ($F(1,32) = 2.79$, $p > .05$ and $F(1,32) = 1.30$, $p > .05$, respectively). The main effect of blink was significant, $F(2,64) = 3.25$, $p <$ 05.

Pairwise comparisons between the 3 levels of the blink factor did not uncover any significant differences at the .0167 level. Using a t test to compare the means of task time in minutes at the 0 Hz ($M = 3.03$) to 2 Hz level ($M = 3.22$) revealed a non-significant difference, $t(33) = -1.73$, $p > .0167$. As did the t tests comparing the 2 Hz ($M = 3.22$) to 5 Hz level ($M = 3.07$), $t(33) = 1.62$, $p > .0167$, and the 0 Hz ($M = 3.03$) to 5 Hz level ($M = 3.07$), $t(33) = - .40$, $p > .0167$. See Table 10 for the mean task times.

On a 7-point scale, with 1 being extremely disliked and 7 being extremely liked, participants' mean rating for banner ads on Web pages in general was 2.97 ($SD = 1.09$).

Table 8

Mean Task Times for Noticed Ad Collapsed Across Color and Blink

Noticed Ad	M	SD	n
No	2.96	.96	20
Yes	3.31	.77	14

Table 9

Mean Task Times for Color Collapsed Across Noticed Ad and Blink

Color	M	SD	n
B & W	3.20	1.02	34
Color	3.08	.94	34

Table 10

Mean Task Times for Blink Rate Collapsed Across Noticed Ad and Color

Blink Rate	M	SD	n
0 Hz	3.03	.85	34
2 Hz	3.22	1.01	34
5 Hz	3.07	.96	34

For blinking ads on Web pages the mean rating was 2.03 (SD =1.17). Figures 13 and 14, respectively, show the bar graphs for these data.

Finally, when asked what participants normally did when presented with a blinking ad on a Web page, each participant reported using multiple strategies. Of the 34 participants, the most common strategies reported were turning off the ads (88%), reading then ignoring them (88.2%), trying to get off the page quicker (82%), closing the page (79%), or scrolling the ad off the page (71%). Only 29% reported ignoring the ads. See Figure 15 for the bar graph of this data.

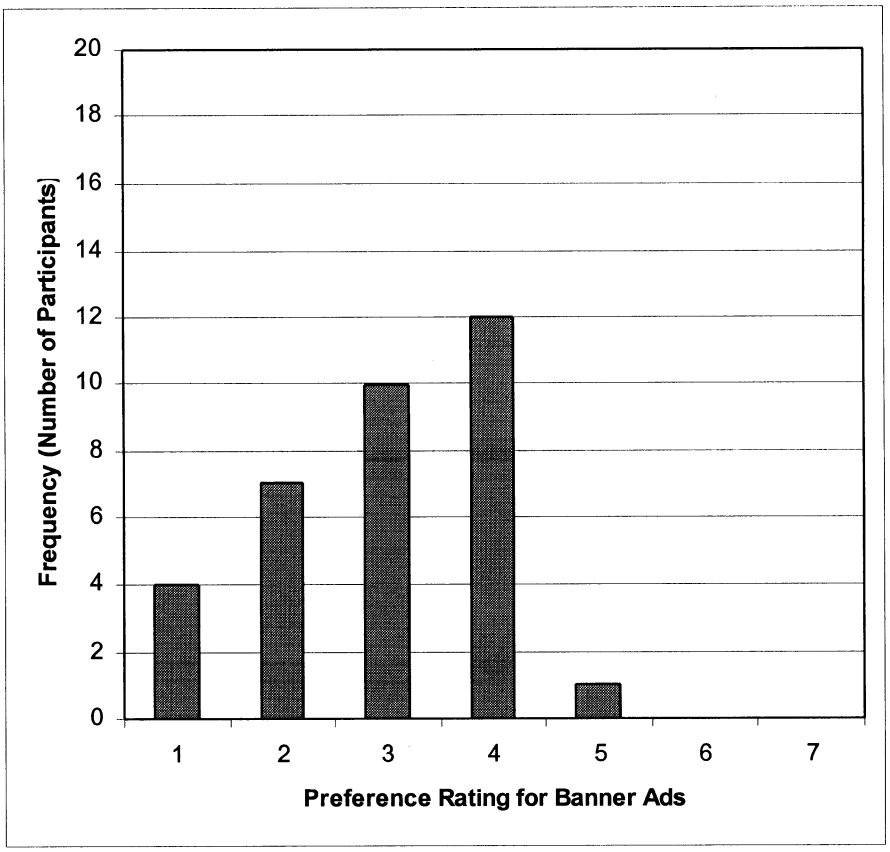


Figure 13. Participants' ratings of banner ads on Web pages in general on a 7-point scale. All points on the scale were labeled. The first point was labeled "Extremely Dislike Them" and the 7th point was labeled "Extremely Like Them." The complete questionnaire can be found in Appendix G.

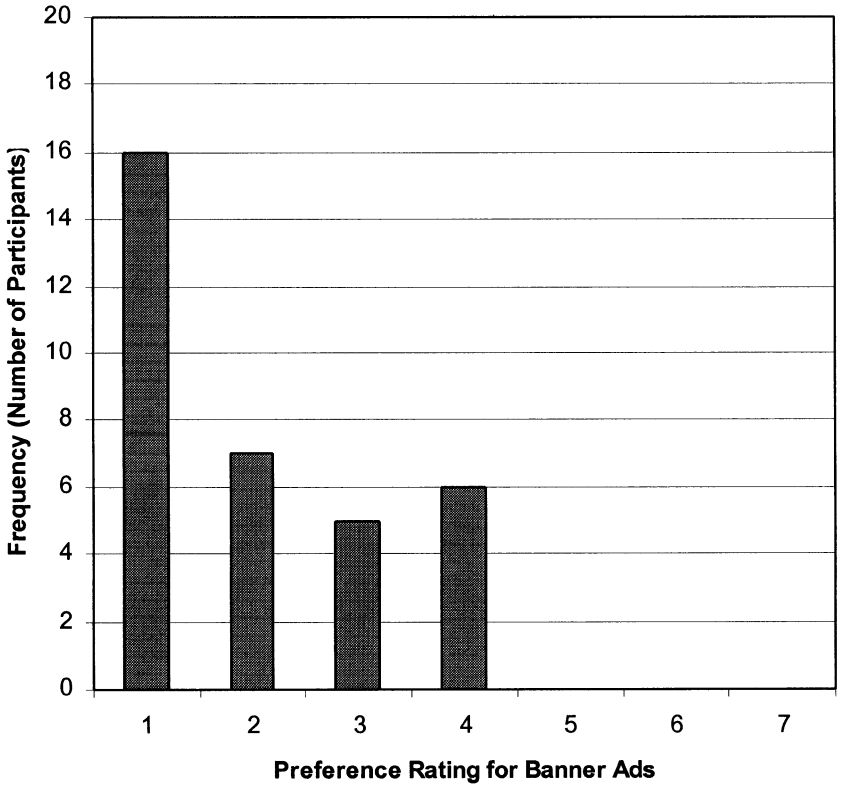


Figure 14. Participants' ratings of blinking banner ads on Web pages on a 7-point scale. All points on the scale were labeled. The first point was labeled "Extremely Dislike Them" and the 7th point was labeled "Extremely Like Them." The complete questionnaire can be found in Appendix G.

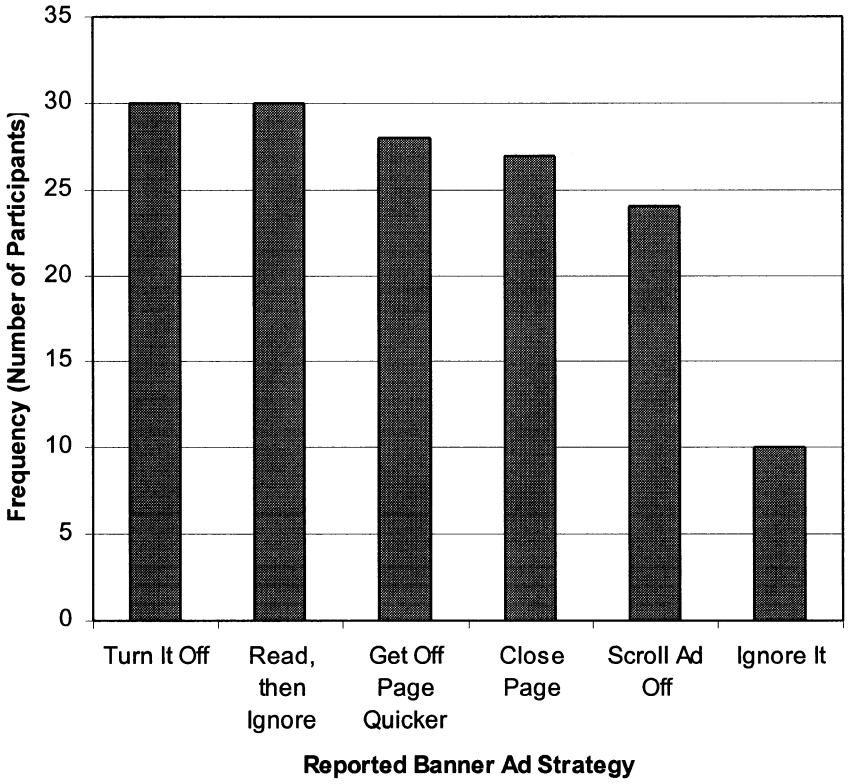


Figure 15. Participants' strategies when presented with a blinking banner ad on a Web page. The complete questionnaire can be found in Appendix G.

CHAPTER 5: DISCUSSION

The results of the main analyses of this experiment did not support the hypothesis that blinking ads on Web pages cause a task performance decrement. To recall:

The first hypothesis stated that the speed and accuracy of selecting search results on a Web page with a blinking banner ad would be less than that on a page with a static banner ad. This was tested by analyzing the complex comparisons of the main effect of blink vs. no blink collapsed across color for the dependent variables of task time, search result score and ticker score. The non-significant result showed no support for this hypothesis.

The second hypothesis stated that an increase in the frequency of the blinking ad would result in a further decrease in speed and accuracy of selecting search results. The linear trend analysis run for each of the dependent variables was not significant showing no support for this hypothesis.

Finally, the third hypothesis stated that the addition of an ancillary attention mechanism to the ad such as color would result in a greater decrease in speed and accuracy than just blink rate alone. The lack of significant Blink x Color interaction for task time, ticker and search result scores did not show support for this hypothesis.

As an additional note, analysis of the post-study questionnaire showed ecological support for the study design in that it brought out findings similar to those in usability studies reported by Nielsen (1999) and Spool (1999) — that blinking banner ads annoy some users while some have learned to "tune" them out. In addition, participants in this

study reported using the same techniques to avoid blinking banner ads as those reported by Nielsen and Spool.

Exploratory data analysis implied that while task times for participants who reported not noticing the ad during the study remained flat at all levels of blink rate, they differed for participants who reported noticing the ad. As depicted in Figure 12, it appeared that there was an increase in task time for participants who noticed the ad at the 2 Hz level of blink rate above that at the 0 Hz and 5 Hz levels. The significant Blink x Noticed Ad interaction showed support for the hypothesis that task time differences existed between participants who reported noticing the ad as compared to participants who did not. Analysis of the simple effects of blink at the yes level of the noticed ad factor, while not significant at the alpha level of .0167, did suggest that something was affecting the task time for participants who noticed the ad. Further research will need to be performed to determine this.

So it appears that for users who notice blinking ads on Web pages that there is a performance decrement with respect to time depending on the blink rate of the ad. This could be explained by a visual synchronization effect whereby the user's task performance becomes synchronized with the blink rate of the ad. Most of the literature on visual synchronization deals with determining whether or not there is a central internal timing mechanism or if there are separate timing mechanisms per perceptual modality (Dunlap, 1910; Kohlers & Brewster, 1985; Chen, Repp & Patel, 2002). These studies employ synchronized tapping tasks where subjects tap to the rhythm of the visual stimulus presentation, then attempt to keep the same rhythm without the visual stimulus.

These studies do not address the indirect synchronization effect of a visual stimulus on a task. While there is not much literature on the subject of visual synchronization there is some literature pointing in this direction.

Smith and Goodwin (1972) tested the effect of blink on a check-reading task – where the passage being read blinked at a 3 Hz rate and subjects had to look for misspellings (randomly inserted letter substitution errors). They found that accuracy was not affected, but speed was affected and hypothesized that subjects synchronized their scanning to the blink rate. The difference between Smith and Goodwin's study and the current study was that the whole passage blinked and was the focus of the subjects' attention where as the blinking object in the current study was not the target.

Skelly (1992) did find that visual attention could be entrained by the rhythm and rate of a dynamic visual stimulus. Over the course of three experiments, the presentation of visual stimuli (letters and shapes) was manipulated between simple and complex rhythmic patterns and a range of rates (slow and fast). The subjects performed a simple selective attention task with classification judgment of shape or letter. The studies found that subjects who were presented with a complex rhythm (stimulus onset asynchronies – SOA's – were different) had longer reaction times than those presented with a simple rhythm (SOA's were the same). In the present study, the rhythms could be classified as simple rhythms – the 50:50 presentation of on/off cycles. Skelly's study also found that slowing of the rhythm resulted in longer reaction times. The difference between Skelly's study and the present one is that the task stimuli (the only stimuli) were visually dynamic

– presented in differing rhythms and rates, and in the present study, it was the irrelevant stimulus that was dynamic (rhythm was the same, but rate differed).

Conclusion

This study did not find support for the hypothesis that blinking ads on Web pages result in a performance decrement overall. However, when taking into account whether or not participants reported noticing the ad during the study, there were differences in task time. Notably that participants who reported not noticing the ad had flat task times, and those who reported noticing the ad had task times that differed over different blink rate presentations of the ad. These results could be explained by an entraining effect of the blinking of the ad. Further testing with Internet users who notice blinking ads would need to be performed to substantiate this hypothesis.

Finally, this study corroborated findings by Spool (1999) and Nielsen (1999) that some Internet users are annoyed by blinking ads while others have learned to ignore them. This knowledge further supports the recommendations by the field of human factors to use the HL technique of blinking on Web pages sparingly, and to allow users the ability to stop the blinking (Tullis, 1988).

REFERENCES

Abramov, I. & Gordon, J., (1974). Vision.. In Carterette, E. C., and Friedman, M. (Eds.), Handbook of Perception, Volume 3 (pp. 376 – 377). New York: Academic Press.

Black, J., (2001, August 1). Old ads, new metric. Internet World: 28 –30.

Chen, Y., Repp, B. H., & Patel, A. D., (2002). Spectral decomposition of variability in synchronization and continuation tapping: Comparisons between auditory and visual pacing and feedback conditions. Human Movement Science, 21 (4), 515 – 532.

Donner, K. A., McKay, T., O'Brien, K., & Rudisill, M., (1995). Display format and highlighting validity effects on search performance using complex visual displays. In Perlman, G., Green, G., and Wogalter, M. S. (Eds.), Human factors perspectives in human-computer interaction: selections from proceedings of Human Factors and Ergonomics Society Meetings, 1983 - 1994, (pp 241-245). Santa Monica: Human Factors and Ergonomics Society.

Fisher, D. L., & Tan, K. C., (1989). Visual displays: The highlighting paradox. Human Factors, 31 (1), 17-30.

Galitz. W.O. (1989). Color in screen design. In Handbook of screen format design (pp. 203-218). Wellesly: QED Information Sciences, Inc.

IEntry, Inc. (2004). DoubleClick releases study of click rates, effective ad styles [On-line]. Available: http://www.webpronews.com/news/ebusinessnews/wpn-45-20040511DoubleClickReleasesStudyOfClickRatesEffectiveAdStyles.html.

Interactive Advertising Bureau (2003). Standards and guidelines [On-line]. Available: http://www.iab.net/standards/adunits.asp.

Inter Commerce Corporation (2001). Internet User Survey #1 [On-line]. Available: http://www.survey.net

Kolers, P. A., & Brewster, J. M. (1985). Rhythms and responses. Journal of Experimental Psychology: Human Perception and Performance, 11 (2), 150 – 167.

Lalomia, M. J. & Happ, A. J. (1987). The effective use of color for text on the IBM 5153 color display. Proceedings of the Human Factors Society 31st Annual Meeting, 1091-1095. Santa Monica, CA: HFES.

Lavie, N., & Cox, S. (1997). On the efficiency of visual selective attention: efficient visual search leads to inefficient distractor rejection. Psychological Science, 8, 395 – 398.

NetRatings, Inc. (2003). Advertising giants bolster the online medium [On-line]. Available:http://www.adrelevance.com/intelligence/intel_spapshot.jsp?pr=030310

Nielsen, J. (1999). Content design. In Designing web usability (pp. 98–161). Indianapolis: New Riders Publishing.

Nua Internet Surveys (2002). How Many Online? [On-line]. Available: http://www.nua.ie/surveys/how_many_online/index.html

Online Computer Library Center, Inc. (2002). Web Characterization Project: Web Statistics [On-line]. Available: http://wcp.oclc.org.

Skelly, J. J., (1992). Pacing visual attention: Temporal structure effects (Doctoral dissertation, Ohio State University, 1992). Dissertation Abstracts International, 53(11-B), 6018.

Smith, M. J. & Cohen, W.J., (1997). Design of computer terminal workstations. In Handbook of human factors and ergonomics (pp. 1681). New York: John Wiley & Sons, Inc.

Smith, S. L., & Goodwin, N. C., (1971). Blink coding for information display. Human Factors, 13, 283 – 290.

Smith, S. L., & Goodwin, N. C., (1972). Another look at blinking displays. Human Factors, 14 (4), 345 – 347.

Spool, J. M., Scanlon, T., Schroeder, W., Snyder, C. & DeAngelo, T. (1999). Graphic design on the web. In Web site usability: A designer's guide (pp. 83-93). San Francisco: Morgan Kaufmann Publishers.

Tan, K. C., & Fisher, D. L., (1995) Highlighting and search strategy considerations in computer-generated displays. In Perlman, G., Green, G., and Wogalter, M. S. (Eds.), Human factors perspectives in human-computer interaction: selections from proceedings of Human Factors and Ergonomics Society Meetings, 1983 - 1994, (pp 80-84). Santa Monica: Human Factors and Ergonomics Society.

Thackray, R. L. & Touchstone, R. M. (1991). Effects of monitoring under high and low task load on detection of flashing and coloured radar targets. Ergonomics, 34 (8), 1065-1081.

Treisman, A., Kahneman, D., & Burkell, J. (1983). Perceptual objects and the cost of filtering. Perception & Psychophysics, 33, 527-532.

Tse, Stephen (2000). The effect of highlighting formats on the identification process during visual search. San Jose State University.

Tullis, T. S., (1988). Screen Design. In Helander, M. (Ed.), Handbook of human-computer interaction (pp. 377-411). Amsterdam: Elsevier Science Publishers, B.V.

Van Orden, K. F., Divita, J., & Shim, M. J. (1993). Redundant use of luminance and flashing with shape and color as highlighting codes in symbolic displays. Human Factors, 35, 195-204.

Weibe, Eric. C., & Howe, Julie, E. (1997). Graphics design on the web. In Forsythe, C., Grose, E., & Ratner, J. (Eds.), Human factors and web development (pp. 225-239). Mahwah: Lawrence Erlbaum Associates.

Wickens, C.D.(1992). Introduction to engineering psychology and human performance. Engineering psychology and human performance. (pp. 1-23). New York: Harper Collins Publishers, Inc.

Wolfe, J. M., (1998). Visual search. In Pashler, H. (Ed.) Attention (pp. 13-74). Essex: Psychology Press Ltd.

Zeff, R. & Aronson, B. (1999). Advertising on the internet (2nd ed.). New York: Wiley Computer Publishing.

Zwaga, H. J. G., & Duijnhouwer, F. (1995). The influence of a fixed background in a VDU display on the efficiency of colour and shape coding. In Perlman, G., Green, G., and Wogalter, M. S. (Eds.), Human factors perspectives in human-computer interaction: selections from proceedings of Human Factors and Ergonomics Society Meetings, 1983 - 1994, (pp 19-23). Santa Monica: Human Factors and Ergonomics Society.

APPENDIX A

Test Orders

Key

Ad Color	
R	Red text on black background
W	White text on black background

Search Result Exercise	
Euro	What is today's US dollar exchange rate with the Euro?
SARS	What are the latest worldwide outbreak statistics for SARS (Severe Acute Respiratory Syndrome)?
Unemp	What was the US Unemployment Rate for June 2003?
Census	What was the latest census population of the USA?
Sharp	How do you sharpen a knife?
Low Tide	When is low tide in the San Francisco Bay today?
Labor	What is the origin of Labor Day in the US?

Participant	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
1	Euro W 0 Hz	Labor R 5 Hz	SARS R 2 Hz	Unemp W 5 Hz	Census W 2 Hz	Sharp R 0 Hz	Low Tide W 0 Hz
2	Euro W 0 Hz	Sharp R 0 Hz	Unemp W 5 Hz	SARS R 2 Hz	Low Tide W 0 Hz	Labor R 5 Hz	Census W 2 Hz
3	Euro W 0 Hz	Census W 2 Hz	Labor R 5 Hz	Sharp R 0 Hz	SARS R 2 Hz	Low Tide W 0 Hz	Unemp W 5 Hz
4	Euro W 0 Hz	Low Tide W 0 Hz	Sharp R 0 Hz	Labor R 5 Hz	Unemp W 5 Hz	Census W 2 Hz	SARS R 2 Hz
5	Euro W 0 Hz	Unemp W 5 Hz	Low Tide W 0 Hz	Census W 2 Hz	Sharp R 0 Hz	SARS R 2 Hz	Labor R 5 Hz
6	Euro W 0 Hz	SARS R 2 Hz	Census W 2 Hz	Low Tide W 0 Hz	Labor R 5 Hz	Unemp W 5 Hz	Sharp R 0 Hz

Participant	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
7	Euro W 0 Hz	Labor W 0 Hz	SARS W 5 Hz	Unemp R 0 Hz	Census R 2 Hz	Sharp R 5 Hz	Low Tide W 2 Hz
8	Euro W 0 Hz	Sharp R 5 Hz	Unemp R 0 Hz	SARS W 5 Hz	Low Tide W 2 Hz	Labor W 0 Hz	Census R 2 Hz
9	Euro W 0 Hz	Census R 2 Hz	Labor W 0 Hz	Sharp R 5 Hz	SARS W 5 Hz	Low Tide W 2 Hz	Unemp R 0 Hz
10	Euro W 0 Hz	Low Tide W 2 Hz	Sharp R 5 Hz	Labor W 0 Hz	Unemp R 0 Hz	Census R 2 Hz	SARS W 5 Hz
11	Euro W 0 Hz	Unemp R 0 Hz	Low Tide W 2 Hz	Census R 2 Hz	Sharp R 5 Hz	SARS W 5 Hz	Labor W 0 Hz
12	Euro W 0 Hz	SARS W 5 Hz	Census R 2 Hz	Low Tide W 2 Hz	Labor W 0 Hz	Unemp R 0 Hz	Sharp R 5 Hz
13	Euro W 0 Hz	Labor W 2 Hz	SARS R 0 Hz	Unemp R 5 Hz	Census W 5 Hz	Sharp W 0 Hz	Low Tide R 2 Hz
14	Euro W 0 Hz	Sharp W 0 Hz	Unemp R 5 Hz	SARS R 0 Hz	Low Tide R 2 Hz	Labor W 2 Hz	Census W 5 Hz
15	Euro W 0 Hz	Census W 5 Hz	Labor W 2 Hz	Sharp W 0 Hz	SARS R 0 Hz	Low Tide R 2 Hz	Unemp R 5 Hz
16	Euro W 0 Hz	Low Tide R 2 Hz	Sharp W 0 Hz	Labor W 2 Hz	Unemp R 5 Hz	Census W 5 Hz	SARS R 0 Hz
17	Euro W 0 Hz	Unemp R 5 Hz	Low Tide R 2 Hz	Census W 5 Hz	Sharp W 0 Hz	SARS R 0 Hz	Labor W 2 Hz
18	Euro W 0 Hz	SARS R 0 Hz	Census W 5 Hz	Low Tide R 2 Hz	Labor W 2 Hz	Unemp R 5 Hz	Sharp W 0 Hz
19	Euro W 0 Hz	Labor R 2 Hz	SARS R 5 Hz	Unemp W 0 Hz	Census R 0 Hz	Sharp W 2 Hz	Low Tide W 5 Hz
20	Euro W 0 Hz	Sharp W 2 Hz	Unemp W 0 Hz	SARS R 5 Hz	Low Tide W 5 Hz	Labor R 2 Hz	Census R 0 Hz
21	Euro W 0 Hz	Census R 0 Hz	Labor R 2 Hz	Sharp W 2 Hz	SARS R 5 Hz	Low Tide W 5 Hz	Unemp W 0 Hz
22	Euro W 0 Hz	Low Tide W 5 Hz	Sharp W 2 Hz	Labor R 2 Hz	Unemp W 0 Hz	Census R 0 Hz	SARS R 5 Hz
23	Euro W 0 Hz	Unemp W 0 Hz	Low Tide W 5 Hz	Census R 0 Hz	Sharp W 2 Hz	SARS R 5 Hz	Labor R 2 Hz
24	Euro W 0 Hz	SARS R 5 Hz	Census R 0 Hz	Low Tide W 5 Hz	Labor R 2 Hz	Unemp W 0 Hz	Sharp W 2 Hz

Participant	Task 1	Task 2	Task 3	Task 4	Task 5	Task 6	Task 7
25	Euro W 0 Hz	Labor W 5 Hz	SARS W 0 Hz	Unemp W 2 Hz	Census R 5 Hz	Sharp R 2 Hz	Low Tide R 0 Hz
26	Euro W 0 Hz	Sharp R 2 Hz	Unemp W 2 Hz	SARS W 0 Hz	Low Tide R 0 Hz	Labor W 5 Hz	Census R 5 Hz
27	Euro W 0 Hz	Census R 5 Hz	Labor W 5 Hz	Sharp R 2 Hz	SARS W 0 Hz	Low Tide R 0 Hz	Unemp W 2 Hz
28	Euro W 0 Hz	Low Tide R 0 Hz	Sharp R 2 Hz	Labor W 5 Hz	Unemp W 2 Hz	Census R 5 Hz	SARS W 0 Hz
29	Euro W 0 Hz	Unemp W 2 Hz	Low Tide R 0 Hz	Census R 5 Hz	Sharp R 2 Hz	SARS W 0 Hz	Labor W 5 Hz
30	Euro W 0 Hz	SARS W 0 Hz	Census R 5 Hz	Low Tide R 0 Hz	Labor W 5 Hz	Unemp W 2 Hz	Sharp R 2 Hz
31	Euro W 0 Hz	Labor R 0 Hz	SARS W 2 Hz	Unemp R 2 Hz	Census W 0 Hz	Sharp W 5 Hz	Low Tide R 5 Hz
32	Euro W 0 Hz	Sharp W 5 Hz	Unemp R 2 Hz	SARS W 2 Hz	Low Tide R 5 Hz	Labor R 0 Hz	Census W 0 Hz
33	Euro W 0 Hz	Census W 0 Hz	Labor R 0 Hz	Sharp W 5 Hz	SARS W 2 Hz	Low Tide R 5 Hz	Unemp R 2 Hz
34	Euro W 0 Hz	Low Tide R 5 Hz	Sharp W 5 Hz	Labor R 0 Hz	Unemp R 2 Hz	Census W 0 Hz	SARS W 2 Hz
35	Euro W 0 Hz	Unemp R 2 Hz	Low Tide R 5 Hz	Census W 0 Hz	Sharp W 5 Hz	SARS W 2 Hz	Labor R 0 Hz
36	Euro W 0 Hz	SARS W 2 Hz	Census W 0 Hz	Low Tide R 5 Hz	Labor R 0 Hz	Unemp R 2 Hz	Sharp W 5 Hz

APPENDIX B

Search Result Lists

What is today's US dollar exchange rate with the Euro?

Key: 1N ; 2N; 3N; 4N; 5Y; 6Y; 7N; 8Y; 9Y; 10Y; 11Y; 12N; 13N; 14Y; 15N; 16Y; 17Y; 18N; 19N; 20N; 21Y; 22N; 23Y; 24Y; 25Y; 26N; 27N; 28N; 29Y; 30N

1. **Cato News Release – 2003**
   ... As I pointed out in my May 1, 2002 testimony ... from the Bush administration concerning its views on exchange rates. ... managing director of the IMF: The US has a ...
   www.cato.org/new/01-03/01-28-03r.html

2. **Exchange Rates**
   ... B1. Exchange rates for NZ dollar. Monday to Friday. B2. ... C7. M3 financial institutions' weighted average interest rates for NZ dollar funding and claims... New Zealand ...
   http://www.rbnz.govt.nz/statistics/exandint/B1/data.html

3. **Turkish Press Archive**
   ... on Saturday that the decrease in foreign exchange rates had to be balanced by reducing interest rates. ... foreign exchange will float and come to balance... Euro/Dollar par...
   www.turkishpress.com/turkishpress/ archive.asp?

4. **Yahoo! - MXSE IPC GRAL IN (Mexican Stock Exchange) Company News**
   ... MXSE IPC GRAL IN (Mexican Stock Exchange) Company News, Mexico ...: Mexico stocks gain on US consumer confidence ... peso slips 2 pct on low rates to 10.434 ...
   biz.yahoo.com/n/_/_mxx.html

5. **washingtonpost.com**
   Business News ... Today's Exchange Rates. ... Market Watch... Powell Expects Diplomatic Trip to Kuwait: Exchange Likely to ... In Brief ...US Warns of ... Signs of Anger, Hunger an...
   www.washingtonpost.com/wp-dyn/ world/mideast/neareast/syria/

6. **Currency Converter - Bank of Canada**
   ... Exchange Rate Look-Up ... Look up rates 1990 – present ... Amount, Use the, Nominal rate HELP Cash rate (+4%) HELP. All currencies...Convert from Currency, Convert to Currency ...
   www.bank-banque-canada.ca/en/exchform.htm

7. **The Euro area and the United States – A tale of two economies**
... and information 17 April 2002 The Euro area and the United States – A tale of two ... policy here and in the US. I will end with my views on where the euro area and US economies are likely ...
www.dnb.nl/english/e_speeches/2002/e_br020417.htm

8. **The Universal Currency Converter ®**
... most popular currency tool, allows you to perform interactive foreign exchange rate calculations on the Internet, using live, up-to-the-minute currency rates. ...
www.xe.com/ucc/

9. **The World's Favorite Currency Site**
... Like our site? Bookmark us or tell a friend! XE.com Quick Currency Converter...click here...Live rates ...Universal Time (GMT). ...
www.xe.com

10. **Yahoo! Finance - Currency Conversion**
Major World Indices | Currency Exchange ... Currency Conversion... - US Markets open in 6 hours and ... Convert, Quantity, Currency 1, To, Currency 2, Afghanistan Afghani (AFA), **...**
quote.yahoo.com/m3

11. **FXConverter - 164 Currency Converter**
... To get the exchange rates for any of the 164 currencies, select the desired currencies from the lists below, as well as the date, language, and ... US Dollar . ...
www.oanda.com/convert/classic

12. **Determinants of the euro real effective exchange rate: a BEER/PEER approach, November 2001**
... of the euro effective exchange rate. The empirical ... that the exchange rate of the euro might have moved out of line ... the exchange rate is inconsistent with ...
www.ecb.int/pub/wp/ecbwp085.pdf

13. **ECB Monthly Bulletin euro area statistics - Methodological note**
... Effective exchange rate of the euro... of the euro area with 12 participating countries ... Effective exchange rate of the euro author European... up to December ...
www.ecb.int/stats/mb/ecb_bull_10note.pdf

14. **Exchange rate currency conversion from 1-Click Currency**
CONVERT amount, FROM: base currency Afghanistan Afgani, Af. ...
Description: Exchange rates and currency conversions. Print a currency travel card for your wallet or use the...
www.currency.co.nz/

15. **Exchange rate volatility and euro area imports**
... Of The Real Effective Euro Exchange Rate By C. Detken, A. Dieppe, J ... Value Of The Real Effective Euro Exchange Rate By C. Detken, A ... referees and discussions with R. Mestre, G. Fagan and ...
www.ecb.int/pub/wp/ecbwp160.pdf

16. **Exchange Rates**
The given values on this site are gathered from the Federal Reserve Bank of New York, representing the 12 noon buying rates and the International Monetary Fund ...
Description: Currency exchange rates, time plotted charts, conversion tables, calculator and historic lookups.
www.x-rates.com

17. **OANDA.com, The Currency Site**
... US ... Real Time Currency Rates, The Economist Big Mac Price Index. ... Lists a currency converter, currency cheat sheet and a travel expense manager. Purchase a foreign...
www.oanda.com/

18. **The International Role of the Euro and the ESCB's Monetary Policy**
... of the euro area could easily conflict with the maintenance ... In line with the ESCB's approach to the euro exchange rate ... stable euro/dollar exchange rate. At the current ...
www.ecb.int/key/sp981120.htm

19. **C. Noyer: The international impact of the euro**
Speech by Christian Noyer,Vice-President of the European Central Bank, on the occasion of his visit to the United States ... exchange rate and asset price volatility. In the future, the international role of the euro ...
www.ecb.int/key/00/sp000113.htm

20. **ECB PRESS RELEASE - Euro central rates and intervention rates in ERM II**
... Article 1 of the European Central Bank Agreement of 1 Sept 1998 on an Exchange Rate Mechanism in ... compared with the ones set on 31 Dec 1998. The euro central rates as ...
www.ecb.int/press/00/pr000117.htm

21. **ExchangeRate.com - Exchange Rate - Currencies - Graphs - International Currency - Foreign Money - Forex**
The exchange rate, foreign currency, historical data and graphs updated daily. ... 8505%DENMARK Krone DKK 6.352790 6.294009 +0.9339%EUROPEAN UNION Euro EUR 0.851537 0.843658 +0.9339%FINLAND ...
www.exchangerate.com

22. **The EURO - Europes's New Currency**
... With the changeover to the euro on January 1 ... get for one euro). This brings Europe into line with the practice in other countries, notably the United States. The ...
pacific.commerce.ubc.ca/xr/euro

23. **Currencies of the World**
Comprehensive list of all currencies of the world, with subdivisions, ISO-4217 codes, and links to current exchange rate... of 2.7 currency units per US-$....exchange rate calculator...
pacific.commerce.ubc.ca/xr/currency_table.html

24. **Foreign Exchange Canadian Exchange Rate US Exchange Rate Curency Currecy Exchange**
... offers professional foreign currency exchange services for .... Euro US Canadian Exchange Rate Dollars & Sense Did you know that it ...free rate converter, click here...
www.cambridgefx.com/currency-exchange/cu...y_exchange.html

25. **FRB: H.10 Release--Foreign Exchange Rates, Release Dates**
... Statistical Release, H.10, Foreign Exchange Rates (Daily); title... research and data Accessibility | Contact Us Last update ... Rate Conversion Calculator...
www.federalreserve.gov/releases/h10

26. **Exchange Rates - Bank of Canada**
... Rates updated daily. ... Currency: Pick currency. ... Canadian exchange rate = ...
www.bank-banque-canada.ca/en/exchange.htm

27. **The EU's relations with the United States of America - The Euro and US dollar:**
The EU's relations with the United States of America - The Euro and US dollar: ... of currency exchange and risks associated with exchange rate fluctuations were removed and economic ...
www.europa.eu.int/comm/external_relation...euro_dollar.htm

28. **... rare and historic Maps & Prints: or always select a sub-category : Map : Americas : North America : United**
... connection with larger available ... Pennsylvania (0) United States Title Cartographer (Date) Price in US$ / Euro$ Info La ... the exchange rate equals:US $ UK £ We ...
www.bergbook.com/htdocs/Text114.htm

29. **Euro Homepage**
... accessible through this page...Link to current exchange rate... Section with basic readings ... Basics ... Acquisitions in the euro area ...The exchange rate of the euro...
www.econ.yale.edu/~corsetti/euro/Euroit.htm

30. **Currency Areas, Exchange Rate Systems and International Monetary Reform - Robert Mundell**
Homepage of Robert Mundell, Columbia University ... Currency Areas, Exchange Rate Systems and International Monetary Reform Robert Mundell C. Lowell Harriss Professor of Economics Columbia University ...
www.columbia.edu/~ram15/cema2000.html

What are the latest worldwide outbreak statistics for SARS (Severe Acute Respiratory Syndrome)?

Key: 1N; 2Y; 3Y; 4N; 5Y; 6N; 7N; 8Y; 9N; 10N; 11N; 12Y; 13Y; 14N; 15N; 16N; 17Y; 18Y; 19Y; 20N; 21Y; 22N; 23Y; 24Y; 25Y; 26Y; 27Y; 28Y; 29Y; 30N

1. **spiked-health | Article | The SARS farce**
   03 Apr 2003... in...Kuwait. But is SARS really on a par with war?...The outbreak of SARS, Severe Acute ... How lethal is the SARS outbreak? Here in Hong Kong, it ... had shown symptoms of SARS (6).In the SARS ...
   www.spiked-online.com/Articles/00000006DD25.htm

2. **SARS outbreaks contained worldwide but threat remains, UN health agency reports**
   ... Acute Respiratory Syndrome (SARS) outbreak, which had accelerated ... and Toronto, Canada. Since the outbreak began, 8 deaths have occurred in Taiwan. Latest global statistics indicate a total of ...
   www.un.org/apps/news/story.asp?NewsID=6954&Cr=sars&Cr1=

3. **Truth about SARS Infection - severe acute respiratory syndrome - atypical pneumonia - facts, symptoms and statistics**
   SARS latest news: SARS infection could become a global pandemic ... period before SARS symptoms develop, SARS ... given in 1998: Latest update: ...If SARS infection becomes firmly established ...
   www.globalchange.com/sars.htm

4. **ACNielsen**
   ACNielsen - Research ... 2003 – The drama of life is re-enacted daily. As war with Iraq and the SARS outbreak descend on many around the world, people in Hong Kong continue to seek entertainment and ...
   www.acnielsen.com.hk

5. **WELCOME TO CHINACDC**
   ... >ENGLISH SARS TOPIC Latest SARS Statistics News Chinese President calls ... and viral load of SARS associated coronavirus pneumonia in a community outbreak Emergency Travel Advisory from ...
   www.chinacdc.net.cn/english/default.asp

6. **TIMEasia.com: News -- Beijing's SARS Attack**
   Doctor and party member insists there are many more cases than officials will ... Beijing-area hospital. LATEST STORIES China: SARS is 'Make or ... Tuesday, April 8, 2003...
   time.com/time/asia/news/daily/0,9754,441615,00.html

7. **Singapore Republic**
   Singapore Republic provides latest Singapore and SE Asia World News from WN ... s travel dream over? Fear of Sars has emptied airports Before the outbreak of the deadly Sars virus, China was one ...
   www.singaporerepublic.com

8. **SARS Watch Org by Tim Bishop**
   SARS: Australia...Belgium...Brazil...Total World... graph of the spread of SARS... total to date...showing infection and mortality total...graph showing infection and mortality cases per day...
   http://www.diaspoir.net/health/sars/Total.htmlwww.sarswatch.org

9. **EMBASSY OF SWITZERLAND IN CHINA - CHINESE BUSINESS BRIEFING**
   Embassy of Switzerland in Beijing - China, Chinese Business Briefing ... of last year's GDP, from 12% in 1997. (Dow Jones, 22 May) The SARS outbreak is also expected to lead to a loss of CNY20 to 30 ...
   www.sinoptic.ch/cbb

10. **CHINA ONLINE - The Information Network for China**
    ... the latest customs statistics released by the Ministry of Commerce. (207 words) Full story ... Scientists to test SARS vaccine on animals ... response to the SARS outbreak had 'have undermined ...
    www.chinaonline.com/default.asp

11. **Access Asia - All you need to know about business in Asia**
    ... Market...more 26/05/03 - VC Hit by SARS Outbreak...more Access Asia Platinum Access Asia Platinum ... Social Statistics - Spreadsheet China Market Statistics - Spreadsheet China Retail Statistics ...
    www.accessasia.co.uk

12. **MEDLINEplus: Severe Acute Respiratory Syndrome**
    Severe Acute Respiratory Syndrome ... Status of the Outbreak ... World Health Organization) Statistics Cumulative Number of Reported Cases (SARS) (World Health ...
    www.nlm.nih.gov/medlineplus/severeacuter...rysyndrome.html

13. **Philippine Council for Health Research and Development**
    ... S.A.R.S. - Basic Information - Updates & Statistics SARS: Status of the outbreak and lessons for the immediate ... SUBSCRIPTION Get bi-monthly updates on latest health and health research news ...
    www.pchrd.dost.gov.ph

14. **Sympatico.ca High Speed Zone -- Canadian Source for Broadband and Streaming Media**
    Sympatico High Speed features streaming video, audio, canadian news, sports ... Interactives in High Speed Sports Breaking News New SARS outbreak linked to lax precautions SARS survived unnoticed ...
    www1.sympatico.ca/hispeed

15. **Channelnewsasia.com**
    Comprehensive news coverage of Asia-Pacific with special reports from Channel NewsAsia's foreign correspondents and ... Canada steps up SARS control measures after new outbreak more » Latest Forum ...
    www.channelnewsasia.com/stories/main/view/index/.html

16. **Carleton University Debating Society (CUDS) - Main Page**
    The Official Web Site of the Carleton University Debating Society includes ... May 28 2003 11:52AM ET Hong Kong Prepares for Possible SARS Outbreak in Winter New York Times May 28 2003 10:52AM ET ...
    www.freethought.ca/debate

17. **eMedical - Home Page**
    ... information points regarding SARS on the Internet to date with the latest breaking news and statistics on the epidemic, with ... A prime feature is the global SARS outbreak map - a map of the ...
    www.emedical.com.au/default.asp

18. **Latest on SARS from WHO - World Health Organization updates**
WHO continues to track the evolving infectious disease situation... Severe Acute Respiratory Syndrome (SARS)...
Multi-country outbreak - Update 96Weekly Epidemiological Record...
http://www.who.int

19. **Latest CDC info on SARS - Center for Disease Control updates**
Severe Acute Respiratory Syndrome...Information for Specific Groups and Settings...What everyone should know...CDC Hotlines...News & Highlights... Cases: US...Worldwide... Find Your State or Local...
http://www.cdc.gov

20. **Cambodia Post**
... May 28, 2003... Analysis of the latest statistics on the global SARS epidemic reveals that at least 10 per cent of people who contract the new virus will die of the disease. ...
www.cambodiajournal.com/

21. **Trade New Zealand Corporate Web Site: Statistics**
... SARS and read Trade New Zealand's latest SARS global update...Latest outbreak statistics...Introductory Information...Foundation Services. ... Market Selection Services Statistics Regulations and ...
www.tradenz.govt.nz/home.html

22. **SARS and the Matrix**
... Comments? Drop me a line Read the latest Global Angst by clicking here. ... (05/12/03) More 'Fun and Games' with SARS Statistics (05/09/03) SARS and AIDS - Which ...
globalangst.blogspot.com/blog051803.htm

23. **TD Securities Inc. - Equity Desk**
...Investment Strategy: The Latest Global Consensus, SARS,
PDF, April 17, 2003, Momentum Weekly, PDF, ... Statistics Performance. ...
www.tdsecurities.com/EquityResearch

24. **GlobalHealth - Office of Global Health Affairs**
The recent outbreak of Severe Acute Respiratory Syndrome (SARS) in many countries and ...Latest Worldwide Statistics.... Secretary Thompson, who also serves as chairman of the Global Fund to ...
www.globalhealth.gov/index.shtml

25. **Regional Resources on East Asia and Southeast Asia:**
... From The Economist Global Agenda ... & Treatment of Atypical Pneumonia, (in Chinese & English) Latest SARS statistics; geographical distribution of ...
newton.uor.edu/Departments&Programs/

26. **Take another look at those Sars numbers**
... the numbers (which are official figures) with the global Sars toll to ... Will Sars ruin our ... News. ... SARS updates...
business-times.asia1.com.sg/story/ 0,4567,78979-1050782340,00.html

27. **CDC Foundation | SARS**
... Severe Acute Respiratory Syndrome (SARS) is a mysterious respiratory illness that has sickened thousands worldwide, including several ... Current Statistics. ...
www.cdcfoundation.org/health/sars.html

28. **InteliHealth:**
... CDC Data On Worldwide SARS Cases View government statistics on worldwide SARS cases. SARS Quiz Learn more about SARS — including symptoms — in our quiz. ...
www.intelihealth.com/IH/ihtIH/ WSIHW000/29785/35216.html

29. **Update on SARS - Provincial Health Officer**
... SARS statistics for Canada are available from Health Canada. Worldwide SARS statistics are available from the World Health Organization. PDF Format. ...
www.healthplanning.gov.bc.ca/pho/sars.html

30. **Worldwide** HIV **statistics**
Worldwide HIV statistics, from your About.com Guide
aids.about.com/blworld2.htm

What was the US Unemployment Rate for June 2003?

Key: 1Y; 2Y; 3N; 4Y; 5N; 6Y; 7N; 8N; 9N; 10N; 11Y; 12N; 13N; 14N; 15Y; 16N; 17N; 18N; 19Y; 20N; 21N; 22N; 23Y; 24Y; 25Y; 26Y; 27Y; 28Y; 29N; 30N

1. **Unemployment News Release**
   ... Unemployment Rates. Seasonally Adjusted Unemployment Rate June 2003. ... The unadjusted June 2003 unemployment rate for New Hampshire was 4.0 percent. ...
   www.nhes.state.nh.us/elmi/unempnr.htm

2. **New unemployment statistics released for June 2003**
   From National Small Business Association www.nsbaonline.org New unemployment statistics released for June 2003 Jul 7, 2003. The unemployment ...
   nsbaonline.org/content/printer.121.shtml

3. **NLA News, June 2003: The 'Cultural Context of Unemployment' ...**
   NLA News - home June 2003 Volume XIII Number 9. ... The Cultural Context of Unemployment—an Oral Record 1985–1986' photographic album (70 col. ...
   www.nla.gov.au/pub/nlanews/2003/jun03/article5.html

4. **BW Online | July 7, 2003 | Unemployment Rate Rises to 6.3%**
   ... July 7, 2003 ECONOMIC BRIEF Unemployment Rate Rises to 6.3%. The data for June indicate little improvement -- but not much in the ...
   www.businessweek.com/investor/content/ jul2003/pi2003066_6641_pi032.

5. **Birmingham Unemployment Briefing June 2003 – Summary**
   This document is the June 2003 issue of the BEIC's monthly Unemployment Briefing. Unemployment data is released monthly by the Office of National Statistics. ...
   www.birminghameconomy.org.uk/access/sum/ubjun03sum.htm

6. **Employment Situation Summary**
   ... payroll employment was essentially unchanged in June, while the unemployment rate rose to 6.4 percent, the Bureau of Labor Statistics of the US Department of **...**
   www.bls.gov/news.release/empsit.nr0.htm

7. **Hiplogs: Unemployment blues**
   Hiplogs, home | directory | search | usage agreement | how to Monthly archives, Unemployment blues : June 2003 K Sore thumbs and low self esteem make a bad mix. **...**
   www.hiplog.com/hiplog/read/4/318/2003/06/

8. **OECD Standardised Unemployment Rates Paris, 6 June 2003**
   ... OECD Standardised Unemployment Rates Paris, 6 June 2003 2 OECD Standardised Unemployment Rates - percentage of civilian labour force apr may jun jul aug sep ...
   www.oecd.org/pdf/M00041000/M00041881.pdf

9. **Alaska Economic Trends Magazine**
   ... seek. June 2003 Trends. May 2003, Occupational Forecast. ... care. April 2003 Trends. March 2003, Unemployment Insurance Claimants. click ...
   www.labor.state.ak.us/trends/trends.htm - 24k

10. **Research & Analysis Bureau - Calendar of Release Dates**
    ... Top. July 2003. 1 - Montana Prevailing Wage Rates released; 3 – US Unemployment Rate for June 2003 released; 16 - Consumer Price Index ...
    rad.dli.state.mt.us/pubs/calendar.asp

11. **June unemployment rate hits 9-year high - 2003-07-03 - San ...**
    ... More Late News Updated: 2:08 PM PDT Thursday, Jul 3, 2003 » June unemployment rate hits 9-year high » Pacer exec heads to Revlon » Siebel expects lower ...
    sanfrancisco.bizjournals.com/sanfrancisco/stories/2003/06/30/daily42.html?jst=m_ln_hl

12. **New Metropolitan Area Designations based on Census 2000, June ...**
    ... Employment and Unemployment: 2001; Wages from the National Compensation Survey: Published Areas; Labor Market Areas, 2003 (PDF 1 MB). Last Modified Date: June 13 ...
    www.bls.gov/lau/lausmsa.htm

13. **AusStats : 6202.0 Labour Force, Australia**
    ... UNEMPLOYMENT RATE: decreased marginally to 6.1%. ... NOTES FORTHCOMING ISSUES ISSUE, RELEASE DATE. May 2003, 12 June 2003. June 2003, 10 July 2003. ...
    www.abs.gov.au/Ausstats/abs@.nsf/0/9ff2997ae0f762d2ca2568a90013934c?OpenDocument

14. **Bureau of Labor Statistics Home Page**
    ... National Employment • National Unemployment Rate • State and Local ... State and Local Unemployment Rates • Mass ... US Economy at a Glance • Regions, States ...
    www.bls.gov/

15. **CBC News: US unemployment rate takes unexpected jump**
US unemployment rate takes unexpected jump Last Updated Thu, 03 Jul 2003 11:27:09 WASHINGTON - US unemployment hit a nine-year high ...
www.cbc.ca/stories/2003/07/03/USjobless_030703

16. **Latest release from the Labour Force Survey. Friday, July 11, ...**
... and left employment among adult men up only 46,000 (+0.6%) since the start of 2003. Their unemployment rate edged down 0.1 percentage points to 6.6% in June. ...
www.statcan.ca/english/Subjects/Labour/LFS/lfs-en.htm

17. **Indiana Unemployment insurance claims for the week ending June 7, 2003 UI ...**
... For information: Patrick J. Murphy, 317/233-1463 FOR RELEASE: Monday, June 16, 2003 Unemployment insurance claims for the week ending June 7, 2003 NEWS UI ...
www.in.gov/dwd/newsroom/pdfs/6-7-03claims.pdf

18. **INSEE - Economic indicators**
... Employment and labour market. Unemployment and jobs. 06-27-2003 May 2003, 07-31-2003 June 2003, 08-29-2003 July 2003, 09-30-2003 August 2003. Job-seekers. ..France...
www.insee.fr/en/indicateur/indic_conj/liste_indice.asp

19. **US Unemployment Rate; Monthly SA, Percent**
... Multiple Series: | Charting | Excel File / Copy & Paste Format / CSV.Series Title: US Unemployment Rate – 1970 to July 2003... Monthly SA, Percent. For ...
www.economagic.com/em-cgi/data.exe/feddal/ru

20. **Ghost Sites: Steve Baldwin's Unemployment Journal [June 19, 2003 ...**
June 19, 2003 by Steve Baldwin. Steve Baldwin's Unemployment Journal. Entry: 06/19/2003. My painting project is going famously well. ...
www.disobey.com/ghostsites/unemployment_journal.shtml

21. **GENERAL SECRETARIAT OF NATIONAL STATISTICAL SERVICE OF GREECE**
... 11/8/2003, Industrial Production Index - June 2003, Yes, Industrial Production Index - May ... 30/9/2003, Employment / Unemployment / Unemployment Rate - Q2 ...
www.statistics.gr/IMF_eng.asp

22. **Monday 9 June 2003**
... the other side of the boat Monday 16 June 2003 4 Month Ahead June/July 2003 MONDAY TUESDAY ... NON-FARM PAYROLLS, JUN May: -17th Austrailian/New Zealand UNEMPLOYMENT RATE...
personal.macquarie.com.au/market/reports/macweek.pdf

23. **Mercury News | 07/12/2003 | JUNE UNEMPLOYMENT**
... Business, Posted on Sat, Jul. 12, 2003, JUNE UNEMPLOYMENT Santa Clara County's unemployment rate rose three-tenths of a percent from May to June. ...
www.bayarea.com/mld/mercurynews/business/6288656.htm

24. **DOL - Media Center**
... June 2003. Employment is growing steadily and there are almost a quarter of a million more people in employment than this time last year. US Unemployment is ...
www.dol.gov/mediacentr/pressreleases/ 2003/june/stat1106-lms.htm

25. **JEC Democrats**
... NEW RELEASES: • June 6, 2003 – Worst US Jobless Recovery Since 1930... The Economic Outlook - Jobs Slump Persists as Unemployment Insurance Extension ...
jec.senate.gov/democrats/home.htm

26. **ODJFS - News & Events - Press Releases**
... June 20, 2003, Workforce funding will help southern Ohio workers. June 20, 2003, Ohio and US Employment Situation Up from May...US Rates for June 2003...
www.state.oh.us/odjfs/releases/index.stm

27. **Illinois Department of Employment Security**
... Illinois ... 6.1%. May 2003. 3-month ... 6.4%. Mar-May 2003. National ... 6.2%. June 2003. Employers: file quarterly unemployment taxes over the internet. ...
www.ides.state.il.us/

28. **BBC NEWS | Business | June 6. 2003 | US unemployment rate leaps**
US unemployment rate leaps. ... Unemployment in the US rose much faster last month than economists had predicted, sending the official jobless rate to 6.4%. ...
news.bbc.co.uk/1/hi/business/3041854.stm

29. **PMR Ltd. - Polish Economy**
... Excluding fruit and vegetables, prices in the second half of June were the same as in the first ... In June 2003 the lowest registered unemployment rate was ...
www.polishmarket.com/polish_economy.php

30. **CBS News | US Jobless Rate Soars | July 3, 2003 21:35:56**
... Printable Version US Jobless Rate Soars WASHINGTON, July 3, 2003. ... (CBS/AP) The US unemployment rate soared to ... nine-year high of 6.4 percent in June as companies ...
www.cbsnews.com/stories/2003/07/ 03/national/main561546.shtml

What was the latest census population of the USA?

KEY: 1Y; 2Y; 3N; 4Y; 5Y; 6N; 7N; 8N; 9N; 10N; 11N; 12N; 13N; 14N; 15Y; 16N; 17Y; 18Y; 19N; 20N; 21N; 22Y; 23N; 24Y; 25Y; 26N; 27Y; 28Y; 29N; 30Y

1. **Census Bureau Home Page**
   ... At the Bureau, Our Strategic Plan · Regional Offices · Doing business with us · About the Bureau. Census 2000 Data ... Special Topics, Census Calendar · The 1930 Census ...
   www.census.gov/

2. **Census 2000 Gateway**
   US Census Bureau ... Thank you, America, for your participation in Census 2000. The population of the US on April 1, 2000 was 281,421,906 [PDF 2M]. ...
   www.census.gov/main/www/cen2000.html

3. **United States Historical Census Data Browser**
   Where did the data come from? The original source of the each decade's data is the decennial census conducted by the US Census Bureau. ...
   fisher.lib.virginia.edu/census/

4. **State and County QuickFacts**
   US Census Bureau, QuickFacts Main | FAQs | What's New | Related Sites. ... QuickFacts now has even more Census 2000 data! New: Thematic Maps. Source: US Census Bureau. ...
   quickfacts.census.gov/qfd/

5. **American FactFinder**
   ...Index of Census 2000 data provided by the US Census Bureau, including population, ethnic, divorce, economic, poverty,.. **...** maps for all geographies including the US, states, counties, cities, towns...
   factfinder.census.gov/

6. **US Census Bureau Maps and Cartographic Resources**
   US Census Bureau, ... Map Gallery - A representative sample of special purpose maps the US Census Bureau has produced for the 1990 census and select surveys. ...
   tiger.census.gov/

7. **Tiger Map Server Browser**
   US Census Bureau. This mapping engine uses 1998 TIGER/Line ® data and 1990 Decennial Census data. ... US Census Bureau Map Server that pulls up any location using latitude/longitude input.
   tiger.census.gov/cgi-bin/mapsurfer

8. **1990 Census Lookup (1.4a)**
   ... Not all tables are available. Other Related Applications: US Gazetteer Place, County Search Engine for retrieving 1990 Census data and Tiger Maps. ...
   venus.census.gov/cdrom/lookup

9. **USDA-NASS Census of Agriculture**
   USDA Logo NASS Logo US Department of Agriculture National Agricultural Statistics Service. Census of Agriculture. 2 0 0 2, 1 9 9 7. ...
   www.nass.usda.gov/census/

10. **The USGenWeb Census Project**
    Welcome to The USGenWeb Census Project web site ... providing FREE access to all Federal and State Census Facts from 1790 to1930...
    www.us-census.org/

11. **Florida QuickFacts from the US Census Bureau**
    the US Census Bureau ... Data Quality Statement. What do you think of QuickFacts? Source US Census Bureau: State and County QuickFacts. ...
    quickfacts.census.gov/qfd/states/12000.html

12. **Government Information Sharing Project**
    Description: Oregon State University has 49 CD-ROMs full of **US** government statistics and economic information,...
    govinfo.kerr.orst.edu/

13. **1990 Census Name Files**
    US Census Bureau Name Files. NOTE: No specific individual information is given. Name Last modified Size dist.all.last 09-May-95 23 ...
    landview.census.gov/genealogy/names/

14. **Census Online - 38,410 Links to Online Census Records**
    Census Online: Links to Online Census Records. ... Census Online > Links (38,410 Links), ... View Original Census Records Online at Ancestry.com! Ancestry.com. ...
    www.census-online.com/links

15. **FactFinder Kids' Corner!**
... | Why Counting Counts! | Play a Game! About the Site | The Census Bureau's Online Privacy Policy | American FactFinder | US Bureau of the Census.
factfinder.census.gov/home/en/kids/kids.html

16. **GeoLytics - US Census demographic and GIS data products**
GeoLytics is the leading provider of US Census demographic and GIS data products in the US. GeoLytics CensusCD products integrate ... Offers CD of Census and demographic...
www.censuscd.com/

17. **Population Estimates-US Census Bureau**
Latest population data available from the US Census Bureau's population estimates program. return to US Census Bureau home page, go to page content, ...
eire.census.gov/popest/estimates.php

18. **CensusScope: Census 2000 Data, Charts, Maps, and Rankings**
... With hundreds of possible combinations, Census 2000 and trend data...Our charts and rankings can help (see the US Census 2000 Profile). ...
www.censusscope.org/

19. **Cyndi's List - US – Census**
... 1790 US Federal Census. 1790 Federal Census of Tisbury, Dukes Co., Mass. ... US Census Records Online: Indexes, Extractions & Transcriptions: ...
www.cyndislist.com/census.htm

20. **Welcome to the US Census Monitoring Board Web Site**
US Census Monitoring Board is a bipartisan board charged with monitoring the Bureau of the Census' preparations for the 2000 Census and reporting its findings ...
govinfo.library.unt.edu/cmb/cmbp/

21. **NARA 1930 Census Microfilm Locator - Welcome Page**
... . The 1930 Census. Welcome to our comprehensive guide to the 1930 census. ... The census is available for viewing on microfilm at the National Archives Building ...
1930census.archives.gov/

22. **Census Demographics for Louisiana**
... US Census Data Maps and Profiles, US Census Subjects. US Census Tract Street Locator, US Census 2000 Overview. State Census Data Center Local Affiliates. ...
www.state.la.us/census/

23. **Census Project Home Page**
The USGenWeb Archives Census Project was started in February 1997 with the mission of transcribing every US Federal Census to be uploaded to the USGenWeb ...
www.rootsweb.com/~usgenweb/census/

24. **Census 2000 Demographic Profiles**
US Census Bureau Demographic Profiles. Select a state. ... Population of U.S. on April 1, 2001 was 281,421,906...
censtats.census.gov/pub/Profiles.shtml

25. **www.2000.census.gov/**
www.2000.census.gov/

26. **US Census Records 1790-1930 | Online Indexes | Census Clues**
... What's in the US Census Records? Clues & Research Tips. ... 1790-1840 Notes The US census records from 1790 to 1840 only name the head of each family. ...
home.att.net/~wee-monster/census.html

27. **Howstuffworks "How the Census Works"**
The US census is a huge, $6.5 billion project bent on counting every US resident!... Who's counted?...What was the census count in 2000?... How long has it been around?....
www.howstuffworks.com/census.htm

28. **Census 2000 TIGER/Line Data**
... Provider: US Bureau of the Census. ... Price: Free. TIGER logo are registered trademarks of the US Bureau of the Census. ... Census 2000 FAQ...Download Data: Census 2000...
www.esri.com/data/download/census2000_tigerline/

29. **US Census 1990 - Polonia in USA**
US Census 1990 - Polish American - Polonia in USA ... 9,764 51 South Dakota 9,139 sources: US Census Bureau - Year 1990 ... check US Census from year 2000 Note: PolishInternet.com is not ...
www.polskiinternet.com/census/indexeng-1990.html

30. **US Census 2000 Results: In-Depth at HeadlineSpot.com**
Learn about the U.S. census report at HeadlineSpot.com. ... Time) Related Sites U.S. Census Bureau | State Census Project | Census Online | U.S. Historical Census Data Browswer Related On ...
www.headlinespot.com/indepth/uscensus.htm

How do you sharpen a knife?

KEY: 1N; 2Y; 3N; 4Y; 5N; 6Y; 7N; 8N; 9Y; 10N; 11Y; 12Y; 13Y; 14Y; 15Y; 16Y; 17N; 18N; 19Y; 20Y; 21N; 22Y; 23N; 24Y; 25N; 26N; 27N; 28N; 29Y; 30N

1. **Woodcarving, Sharpening Carving Tools, Carving Instruction**
   ... your next Carving project! Sharpening Carving Tools Bench Knives, Chip Knives, Flat Chisels By LS Irish. Sharpening is not that hard ...
   www.carvingpatterns.com/sharpening.htm

2. **Family Handyman: Sharpening knives and scissors**
   ... Lesson: Sharpening knives and scissors. ... You can buy one for less than $10 (see Buyer's Guide) and it'll do a respectable job of sharpening most kitchen knives. ...
   www.findarticles.com/cf_0/m1080/2_51/70190516/ p1/article.jhtml?term=knives

3. **Kitchenware, cutlery, chopping boards and the Never-need- ...**
   ... All knives are "Never Need Sharpening" knives Price : £28.99 (excluding VAT), ... All knives are "Never Need Sharpening " knives.) Price : £27.99 (excluding VAT), ...
   www.emporiumuk.com/products/cutle001.htm

4. **Sharpening Knives**
   ... This article describes some of the fundamentals of how to test sharpness and the various techniques and tools used in sharpening your valuable knives.
   ...
   www.worldknives.com/sharpening1.asp

5. **The Bladesharpener is capable of sharpening knives, shears, ...**
   Bladesharpener is capable of sharpening knives, shears, scissors and many other items. ... Manufacturers of The Bladesharpener, a hand operated sharpening device...
   www.ezesharp.com.au/

6. **Honing and Sharpening Knives**
   Honing and Sharpening Knives. There are three types of metal alloy used in high quality cutlery today: (1) all carbon steel, (2) high ...
   www.schaafusa.com/honingknives.htm

7. **Sharpening knives for paring leather**
   Sharpening knives for paring leather Paper presented by Søren Ibsen Friday 11th of May 2001 at the conference Enbotraine in Ghent, Belgium. ...
   www.ub.ntnu.no/fakbib/gunnerus/soren/sharpening.html

8. **Wheels for sharpening knives from Sharpknives.com**
... TURN 'EM SLOW, RUN 'EM WET 6'X1" #420 $45 Quantity: 220 GRIT SILICON CARBIDE SHARPENING WHEEL EXTRA-FINE 220 GRIT The best for sharpening knives! ... Order Now...
www.sharpknives.com/sharpeners_sharpwheels.htm

9. **Tip of the week: Sharpening Knives**
Tip of the week: Sharpening Knives By MORRIS AND JAMES CAREY. For AP Weekly Features. A sharp knife can make a carving job easier and safer. ...
www4.fosters.com/home/articles/home_1203d.asp

10. **Motors for sharpening knives from Sharpknives.com**
Great selection of knives, sharpening tools and supplies. Shop here for quality kitchen cutlery for professional chefs and home cooks. ...
www.sharpknives.com/sharpeners_sharpmotors.htm

11. **On The House with the Carey Bros. Home Repair and Improvement ...**
... The Art of Sharpening Knives. ... These knives of the future combine the sharpening properties of carbon steel with the stain-resistant qualities of stainless. ... few essentials required when sharpening are above-average light.... Start by placing the whetstone on a stable surface ...
www.onthehouse.com/wp/20010528

12. **Sharpening Knives**
Knife sharpening basics...It can be. Sharpening Tools. Here's a short rundown on the most common types of sharpening tools for knives. Bench stones are simply ...
knifeoutlet.com/sharpening.htm

13. **Epinions.com - Advice on How Should I Sharpen My Knives?**
... by BartvanHerk, May 08 '00, Sharpening knives: My Method Short course in keeping knives sharp and sharpening them on a flat stone... ...
www.epinions.com/hmgd-Sharpening-Knives

14. **Family Handyman: Sharpening knives and scissors**
... Ceramic sharpening rods are fast and accurate. This system is a great, 20-second method for sharpening knives that are in relatively good shape. ...
www.findarticles.com/cf_0/m1080/2_51/70190516/ p2/article.jhtml?term=knives

15. **1,001 TIPS FROM GREAT COOKS: SHARPENING KNIVES**
Equipment 910. When sharpening knives on a stone, lubricate with liquid dishwashing soap instead of machine oil (toxic). The soap ...
www.epicurious.com/e_eating/e02_secrets/t/910.html

16. **Ameritech.net (SM) Member Information**
... Click index.htm to get started. Complete how-to instructions for sharpening knives and other edged tools are contained in this online book Sharpening Made Easy. ...
www.ameritech.net/users/knives/

17. **Sharpening Knives - www.ezboard.com**
smkim2 Registered User (12/5/02 3:58 pm) Reply, Sharpening Knives I have a very expensive set of Henckel knives but I am unsure how to sharpen them. Any ideas? ...
pub97.ezboard.com/ fcookingwithsaramoultonfrm1.showMessage?topicID=258.topic

18. **Sharpening Knives**
... engagement, richness of word pictures, emotions and feelings.". Sharpening Knives by Coleman. Jonathan's job was to sharpen knives. ...
www.galileo.org/schools/gibson/ past/parkstories/coleman.shtml

19. **Mike Casey's Knife Sharpening Page**
Tips for Sharpening Knives. by Mike Casey. ... I suggest that you throw it into the trash bin to prevent a friend from accidentally re-sharpening some of your knives. ...
www.caseyspm.com/Knives.html

20. **Pocket Knives Plus**
TIPS ON SHARPENING KNIVES Buck Knives, the manufacturer of the knives listed on the Pocket Knives Plus website, advises you follow ...
www.commercemarketplace.com/estore/pocketknivesplus/ tipsonsharpeningknives.html

21. **JustKnives.com professional knives & cutlery featuring Wusthof ...**
... Our family business started sharpening knives in 1922 using a Moleta (a knife sharpening / push cart) on the streets of Philadelphia. ...
www.justknives.com/Professional_Sharpening/ pro_sharpening.html

22. **Home and Garden Television: Table Settings / Décor**
... Sharpening Knives ... few essentials required when sharpening are above-average light, eye protection and a location where metal particles won't contaminate food. Start by placing the whetstone on a stable surface with its end facing you and lubricate the stone with oil or water.
www.hgtv.com/hgtv/ah_entertaining_decor/article/ 0,1801,HGTV_3113_1395067,00.html

23. **Nepali Times News**
... Sharpening knives Parliament begins its budget session from Monday and King Gyanendra will address a joint sitting of both Houses soon after. ...
www.nepalnews.com.np/ntimes/june22-28-2001/ sharpening.htm

24. **Sushi Knife Care, Caring for your knives**
... Sharpening Knives on Water Stones. ... The following instructions are a typical routine for sharpening knives with medium grain and superfine grain stones. ...
sushi-knives.knives-and-cutlery.com/knife-care/ knife-care.html

25. **C. Caprara Food Service Equipment - Knife Sharpener Specials**
... Safe for all alloys - - never detempers. After Stage 1 & 2 sharpening, knives resharpen fast in Stage 2 only! Stage 2 great for serrated knives! ...
www.caprara.com/sharpen.shtml

26. **Sharpening custom knives at BladeGallery.com custom knives, art ...**
... Copyright © 2001 BladeGallery.com Custom Knives, Swords & Daggers Website created by WebSmith Design, Nancy Linford, Daniel O'Malley, & Leo Parker.
www.bladegallery.com/accessories/stonepage.asp

27. **Mundial Knives - Sanders Sharpening Service**
... Prices - Sanders Sharpening Service] [Custom Made Knife Racks - Sanders Sharpening] [Mundial Knives - Sanders Sharpening Service] [Contact Us - Sanders ...
sanderssharpening.com/mundial.htm

28. **sharpening service for machine knives and blades**
We provide sharpening of all knives and blades from the largest paper knife to the smallest router bit, from high speed steel to carbide. NAVIGATION. ...
www.valleyknife.com/

29. **Yahoo! Groups : frozen-assets Messages : Message 14087 of 28808**
Subject: Sharpening knives. Someone asked about sharpening knives on a list I'm on, so I typed this up. I found this article in March/April '94 Cook's Illustrated about the subject...
groups.yahoo.com/group/frozen-assets/message/14087

30. **Chicago Cutlery - World Kitchen**
... Never Needs Sharpening – Never Needs Sharpening knives are serrated to give the knife more cutting surface & stay sharp a long time without any maintenance. ...
www.chicagocutlery.com/index.asp?pageID=74

When is low tide in the San Francisco Bay today?

KEY: 1N; 2Y; 3N; 4N; 5N; 6N; 7N; 8Y; 9Y; 10N; 11N; 12N; 13N; 14N; 15N; 16N; 17Y; 18Y; 19N; 20Y; 21Y; 22N; 23Y; 24Y; 25Y; 26Y; 27N; 28N; 29Y; 30Y

1. **Yahoo! Directory Rock and Pop Artists**
   ... Lowtalkers, The - original rock'n'roll band from the San Francisco Bay Area. Lowtide - hard rock band whose site offers show information, multimedia, lyrics ...
   dir.yahoo.com/Entertainment/Music/Artists/By_Genre/Rock_and_Pop/WhitePages/wp_11.html

2. **OCSC San Francisco Bay - Bay Area Cams**
   ... Click for Berkeley, California ForecastReal Time San Francisco Bay Wind Real-time graphic rendering of wind strength and direction Today's Tide and Current ...
   www.ocscsailing.com/resource/ocsc_clubcams.html

3. A **web conversation about LowTide Ann Jarnet, Robert Greenway, ...**
   ... In 1999 and 2000 Cowichan Bay, British Columbia, joined the network ... I can begin to see the connection between LowTide as a ... San Francisco: Spinsters/Aunt Lute. ...
   www.ecopsychology.org/gatherings4/LOWTIDE.htm

4. **Overview of the Life History, Distribution, Abundance and Impacts ...**
   ... of the juvenile population remains in the subtidal zone during lowtide. ... The Chinese mitten crab was first collected in south San Francisco Bay by commercial ...
   www.anstaskforce.gov/ Mitten%20Crab%20Literature%20Search.htm

5. **A Draft National Management Plan For the Genus Eriochheir**
   ...The literature and the experience in San Francisco Bay indicate that the genus Eriocheir poses a significant threat to the economic and environmental resources
   www.anstaskforce.gov/Chinese-mitten-crab-plan2-02.pdf

6. **Appendix A: Senate Bill 14**
   ... the purpose of this act, the San Francisco Bay includes the ... Point-Stake Point in Suisun Bay) and, specifically ... mean high tide and mean lowtide); and submerged **...**
   www.bcdc.ca.gov/archive/sfbcsc/ad1_sb14.htm

7. **Opaleye**
   ... Status in the bay: Common. Habitat/Range: Found from San Francisco, California to Southern Baja. ... Opaleyes tend to drift to the same tidepool at each lowtide.
   www.odc.ucla.edu/html/body_opaleye.html

8. **National Weather Service - San Francisco Bay Area**
... .TIDE & CURRRENT TABLES. National Ocean Service (NOS) Tide Predictor; San Francisco Tide Tables, 2002, 2003; World Wide Tide Predictor; ...
www.wrh.noaa.gov/Monterey/marine.html

9. **San Francisco Bay Area Marine Weather @ San Francisco Bay.com**
... Eastern Pacific Tropical Cyclone Messages. TIDE & CURRRENT TABLES: San Francisco Tide Tables. Monterey Harbor Tide Table. World Wide Tide Predictor. ...
www.sanfranciscobay.com/ san_francisco_weather_marine.htm

10. **48° North Letters from our readers**
... We haven't seen many boats with "our" name and got a kick out of seeing it in Lowtide. We have been cruising for two years. ... San Francisco Bay was my next port. ...
www.48north.com/may2001/letters.htm

11. **Distributors-California**
... Mountain View, BAY AREA PERFORMANCE 2560 Wyandotte St ... Paradise, LOWTIDE SPECIALTIES 8965 Skyway Paradise, CA ... San Francisco, CALIFORNIA CHOPPERS 1490 Howard San ...
www.thunderpress.net/Distributors/Dealers-CA.html

12. **Maritime Jurisdiction in the Three China Seas**
... have drilled five wells in the North Bay Basin, and ... government, which attended the 1951 San Francisco Peace Conference ... conditions, it might be a lowtide line or ...
www.ciaonet.org/wps/guj01/

13. **Vejer.com - Page 9 – English**
... At lowtide you can walk out to the Island of Sancti ... are a delightful background to a picturesque bay, white sand ... town of the Ciudad and its San Francisco suburb ...
www.vejer.com/page9_eng.htm

14. **Coastside Mothers' Club**
... out the local tipe pool life during a great lowtide. ... July - Riconada Pool in Palo Alto August - San Francisco Zoo. ... May 18 5:30pm Casey's Cafe, Half Moon Bay. ...
www.coastsidemothersclub.org/may2003.html

15. **Music specialists discuss needledrop search and recovery missions ...**
... been shooting aerial BetaSP footage of Chicago, New York, San Francisco and Boston ... The main company, sparkfactor (for- merly Lowtide Images), was originally a ...
www.imagingsound.com/imagingsound/ archive/2002/is021102.pdf

16. **The Inn Above Tide: San Francisco Hotel Guide Hotel Information**
... Navigation Links: · HotelGuide San Francisco · More San Carlos Hotels · More Hotels Beginning with "T" · The Inn Above Tide (You are here.) | Check Rates ...
san.francisco.hotelguide.net/data/h100232.htm

17. **National Weather Service - San Francisco Bay Area - Sunrise/ ...**
... TIDE & CURRRENT TABLES: National Ocean Service (NOS) Tide Predictor; World Wide Tide Predictor; West Coast Tide Predictor; San Francisco Tide Table. ...
www.wrh.noaa.gov/Monterey/sunset.html

18. **San Francisco Bay Tide and Current Tables**
NOAA Tide and Current Tables # San Francisco Bay, California, 2003. ...
unr.edu/homepage/edc/tides.html

19. **Stemming the tide - 2003-06-09 - San Francisco Business Times**
... EXCLUSIVE REPORTS Stemming the tide. San Francisco executives team to retain city's businesses Eric Young. A group of San Francisco ...
sanfrancisco.bizjournals.com/sanfrancisco/ stories/2003/06/09/story6.html

20. **Welcome to baysail.com, San Francisco Bay Sailing and Cruising ...**
... Tide and Current plots for next 48 hours ..Cool Stuff... ... Projected tide heights at the Golden Gate Bridge for the next 48 hours. ...
www.baysail.com/

21. **Tide Tables for San Francisco, CA USA**
Tide Tables for San Francisco, CA USA. SAN FRANCISCO (Golden Gate) CA Time of High and Low Water With level in feet above ...
www.zephyrs.com/sanfran.htm

22. **The Tide-Waiters of San Francisco Bay**
Information on the Sherlock Holmes society The Tide-Waiters of San Francisco Bay. The Tide-Waiters of San Francisco Bay ...
www.lafterhall.com/sherlock9.html

23. **Tide Tables - California, San Francisco - NOAA Tidal Predictions ...**
... California, San Francisco. Graph - Adobe® PDF * Three month tide graphs of tidal predictions, simple calendar form, print, save, email to a friend (100KB+). ...
www.dolphinkey.com/cgi-bin/tidetables/
control.cgi?tti=California,%20San%20Francisco

24. **Free Tide Tables - California, San Francisco - NOAA Tidal ...**
NOAA Tide Station, Latitude, |, Longitude, |, GMT. California, San Francisco, N 37° 48.0', |, W 122° 28.0', |, -800. California, San Francisco ...
freetidetables.com/westSF.shtml

25. **Other San Francisco Bay Area Info**
... TOP ^. Weather, News, and Information: Tide and Current Predictor; National Weather Service for the San Francisco Bay Area; Pacific ...
sfbay.wr.usgs.gov/access/others.html

26. **Actual tide and current data from San Francisco Bay**
...Actual tide and current data from San Francisco Bay...Today's Tide Tables... Often, when planning activities on or along the Bay, the currents ...
geosci.sfsu.edu/courses/geol103/ labs/estuaries/partIIIC.html

27. **ESPN Outdoors**
... of 2 to 4 feet between the high and low tide is good for halibut. Your own boat. You can fish from your own vessel in the large protected San Francisco Bay and ...
espn.go.com/outdoors/fishing/s/ f_fea_halibut_SF03_Rychnovsky.html

28. **BASK Articles - Tomales Bay Shark Fishing**
A PUBLICATION OF BASK - THE SAN FRANCISCO BAY AREA SEA KAYAKERS ... The southern mud flats
of Tomales Bay get relatively ... after a minus one foot lowtide, the water ...
www.bask.org/ARTICLES/3fish.html

29. **Tsunami from 1906 San Francisco Earthquake (USGS)**
... of April 18, 1906, a sea level disturbance (tsunami) was recorded at the Presidio tide gauge station in San Francisco (the station is now located nearby at Ft. ...
walrus.wr.usgs.gov/tsunami/1906.html

30. **Navas' Sailing & Racing in the San Francisco Bay Area**
...Current Conditions in the Bay: Tide, Current, and Wind...Currents: Local Knowledge Marine Software (new). NationalData Buoy ... 228-688-1948; Stations: 46012 Half Moon Bay (24NM SSW of San Francisco); ...
j.navas.home.att.net/sfba_sail/

What is the origin of Labor Day in the US?

KEY: 1Y; 2N; 3Y; 4Y; 5N; 6Y; 7Y; 8N; 9Y; 10Y; 11Y; 12N; 13N; 14Y; 15Y; 16N; 17Y; 18N; 19Y; 20N; 21Y; 22Y; 23N; 24Y; 25Y; 26N; 27Y; 28N; 29N; 30N

1. **Online NewsHour: Origins of Labor Day -- September 2, 1996 2000**
   Online NewsHour, THE ORIGINS OF LABOR DAY. September 2, 2001. The ... In an attempt to appease the nation's workers, Labor Day is born. The ...
   www.pbs.org/newshour/bb/business/ september96/labor_day_9-2a.html

2. **USATODAY.com - Labor Day weekend hurricanes**
   ... in US history. After hovering off the West Florida coast for three days, Elena finally made landfall near Biloxi, Mississippi on Sept, 2 Labor Day, as a ...
   www.usatoday.com/weather/hurricane/ history/labor-day-hurricanes.htm

3. **Labor day In the United States**
   ... Be the labor great or small, Do it well or not at all...History of Labor Day... The symbol of social and economic achievements of American Workers. ...
   www.twilightbridge.com/hobbies/festivals/labor/

4. **Add Flavor to The Holidays With Delicious Cuisine**
   ... Labor Day... History of Labor Day... Peter McGuire's Early Life and his Contributions to the Origin of Labor Day Knights of Labor ...The first labor organization to ...
   www.twilightbridge.com/hobbies/ festivals/general/history.htm

5. **Kwanzaa**
   ... from winter festivals to create this unique celebration of African American origin. ...
   www.classbrain.com/artholiday/ publish/cat_index_30.shtml

6. **Looking Into Holidays Past Through Primary Resources**
   ... Why is Independence Day celebrated on July 4th? What is the origin of Labor Day? How did families celebrate summer in times past? ...
   memory.loc.gov/ammem/ndlpedu/features/ doc_analysis/document/

7. **Law Interview**
   ... the crime. September 2002... Question: What is the origin of Labor Day? Answer: ...In September 1882, the Central Labor Union held the first Labor Day holiday in New York City to honor the American worker.
   www.lawinterview.com/knowledge_archive.html

8. **BNSF Customer Updates - Service Advisory: BNSF 2002 Carload Labor ...**
... BNSF's Labor Day Operating Plan will focus on meeting customers' expectations while ... plans to minimize the number of yard assignments at origin terminals on ...
domino.bnsf.com/website/updates.nsf/0/
A2F038D36C6D314C86256C22004BC25A?Open

9. **Google Directory - Society > Holidays > Labor Day**
... johnshepler.com/articles/laborday.html Origin of the holiday from the first parade in 1882 to the idea that Labor Day should be the other 364 days of the year. ...
directory.google.com/Top/Society/Holidays/Labor_Day/

10. **Our Labor Day - The Real Meaning of the Labor Day Holiday**
... Describes the origin of the holiday Labor Day, and how it spread from New York City to other cities, finally becoming a national holiday. ...
www.johnshepler.com/articles/laborday.html

11. **Labor Day**
... Labor Day. These links and lesson plans are supplemental resources for the Labor Day lesson plan. The History of Labor Day...Learn about the history of Labor Day in the United States from the Department of Labor...
www.classbrain.com/artholiday/ publish/cat_index_26.shtml

12. **May Day Celebration at TheHolidaySpot**
... May day, law day and loyalty day celebrations at TheHolidaySpot.com On 1st of may, loyalty day, may day and law day is celebrated all over the USA and also the ...
www.theholidayspot.com/mayday/

13. **BTS - OAI - Labor Day Air Travel Delays (2000)**
... Information is provided for Labor Day Week 2000 (September 1 – September 7) on: ... Daily Average Flight Delays and Cancellations by Major Origin Airport: ...
www.bts.gov/oai/holidaytravel/laborday2000

14. **Google Directory - Kids and Teens > People and Society > Holidays ...**
... A Brief History of Labor Day - http://www.chron.com/content/chronicle/ae/holidays/97/labor/history.html Traces the origin of this western celebration. ...
directory.google.com/Top/Kids_and_Teens/People_and_Society/Holidays_and_Special_Days/Labor_Day/

15. **SYMBOLS AND CELEBRATIONS**
... A collection of stories describing the origin and history of America's most beloved ... Labor Day: The History of Labor Day - Office of the Secretary/US Department ...
www.usembassy.at/en/us/symbols.htm

16. **The Origin of the US Department of Labor**
... The Origin of the US Department of Labor. ... The law creating a US Department of Labor, signed by ... was virtually overlooked among the historic events of that day. ...
www.dol.gov/asp/programs/history/dolorigabridge.htm

17. **Andy McInerney, May Day, The Workers' Day**
... momentum across the world, it lost steam in its country of origin, the United ... by 1905 it had disavowed May Day altogether, celebrating instead Labor Day on the ...
www.hartford-hwp.com/archives/26/016.html

18. **Biology 101 Lecture Schedule**
... M, 6-Sep, HOLIDAY: Labor Day, ... M, 18-Oct, MIDTERM EXAMINATION, W, 20-Oct, The Origin and Evolution of Living Things: Abiotic Origins, Energy Metabolism, 192-195, 61-62. ...
imiloa.wcc.hawaii.edu/krupp/BIOL101/lectschd.html

19. **Labor Day - History of the Observance of Labor Day**
Please visit our sponsor. Have You Tasted Them Lately? September 1, 2003 Labor Day is a national legal holiday that is over 100 years old. ...
wilstar.com/holidays/laborday.htm

20. **New Jersey Transit**
... weekday evening peek periods if your am final destination, or pm origin terminal, or ... Penn Station New York: Saturday and July 4th Sunday and Labor Day, Departs 8 ...
www.njtransit.com/ne_specialpromos_beach_package.shtm

21. **US DOL - The History of Labor Day**
... June 20, 2003 DOL Home > About DOL > History of Labor Day, The History of Labor Day. ... But Peter McGuire's place in Labor Day history has not gone unchallenged. ...
www.dol.gov/opa/aboutdol/laborday.htm

22. **A brief history of Labor Day**
A brief history of Labor Day. The origins of Labor Day are more than a century old. The first Labor Day parade in New York City was held in September 1982. ...
www.chron.com/content/chronicle/ae/ holidays/97/labor/history.html

23. **Welcome to Workday Minnesota, your leading source for labor news ...**
... Labor News - June 2003 The June news magazine program provides a followup on ... the Willmar 8 produced by students participating in this year's History Day contest ...
www.workdayminnesota.org/

24. **TLC Project Labor Day**
... society. The History of Labor Day. There ... The background for the History of Labor Day featuring US unions can be found here. Pat's Web ...
www.geocities.com/Heartland/Creek/ 9369/project7/labor.html

25. **Celebrate! Holidays In The USA - Labor Day (First Monday in ...**
... On September 5, 1882 the first Labor Day parade was held in New York City. ... History and significance of the American holiday, Labor Day, from the US Embassy in Sweden.
www.usis.usemb.se/Holidays/celebrate/labor.html

26. **Buffalo Holiday Weather History--Labor Day**
... WEATHER FOR THE PAST TEN LABOR DAYS DATE, HIGH, LOW, PRECIP, REMARKS. ... SEPT 7 1998, 68, 56, 0.59, LIGHT RAIN ALL DAY. ... Back to Holiday Weather History Page.
www.erh.noaa.gov/buf/holidays/laborday.htm

27. **Google Directory - Society > Holidays > Labor Day**
... The History of Labor Day - http://www.dol.gov/opa/aboutdol/laborday.htm Explains how the observance came to be and what it means. From the US Dept. of Labor. ...
directory.google.com/Top/Society/Holidays/Labor_Day/

28. **History of Mayday**
... May Day Calendar: May Day History Calendar. May Day The Real Labour Day: May Day - the REAL Labor Day; Labor Day / May Day; May Day the Real Labour Day; May Day The ...
www.mayweek.ab.ca/history.html

29. **Cedars History Report :: Playing on Labor Day Weekend**
General Releases. Cedars History Report Playing on Labor Day Weekend. Playing on Labor Day Weekend. By Rick Brewer, SID Emeritus. Many ...
tarheelblue.ocsn.com/genrel/091102aaa.html

30. **REAL HISTORY COMES TO CINCINNATI, Labor Day weekend 2001**
... TO CINCINNATI, Labor Day weekend, 2002. Visitors from all over the world will come together in Cincinnati for a long weekend of Real History, famous speakers ...
www.fpp.co.uk/cinc/

APPENDIX C

Sample Data File

```
Entered into Exercise 1 Instructions @
September-18-2003 21:06:17:0844 PM
Entered into Exercise 1 Search Page @
Sep-18-2003 21:06:39:135 PM
The Selected Items of Search1 are:
null
null
3
18327
null
null
null
7
35071
8
38055
9
41911
10
43923
11
45115
12
48380
13
50383
14
57443
15
62010
16
65745
17
72495
18
76821
null
null
21
87706
null
23
91953
24
99884
null
26
108486
null
null
```

```
29
119232
30
122096

The History is:
 Value 8397.53 + 2.47 Time 90  Value 8398.93 + 1.40 Time 5158  Value
8400.80 + 1.87 Time 10165  Value 8396.48 - 4.32 Time 15172  Value
8396.33 - 0.15 Time 20179  Value 8397.61 + 1.28 Time 25186  Value
8400.10 + 2.49 Time 30194  Value 8402.38 + 2.28 Time 35201  Value
8399.83 - 2.55 Time 40208  Value 8395.37 - 4.46 Time 45215  Value
8400.20 + 4.83 Time 50222  Value 8399.02 - 1.18 Time 55230  Value
8398.50 - 0.53 Time 60237  Value 8394.94 - 3.55 Time 65244  Value
8394.55 - 0.39 Time 70251  Value 8389.97 - 4.58 Time 75258  Value
8394.86 + 4.89 Time 80266  Value 8390.46 - 4.40 Time 85273  Value
8392.31 + 1.85 Time 90280  Value 8393.46 + 1.15 Time 95287  Value
8394.53 + 1.08 Time 100294  Value 8392.06 - 2.48 Time 105302  Value
8392.90 + 0.84 Time 110309  Value 8395.35 + 2.45 Time 115316  Value
8390.79 - 4.56 Time 120323  Value 8390.81 + 0.01 Time 125330


The actual Hits are:
 Value 8398.93 + 1.40 Time 8783  Value 8400.10 + 2.49 Time 30414  Value
8400.10 + 2.49 Time 31946  Value 8394.86 + 4.89 Time 84091  Value
8392.31 + 1.85 Time 92033  Value 8393.46 + 1.15 Time 100274  Value
8394.53 + 1.08 Time 101546  Value 8395.35 + 2.45 Time 115546  Value
8395.35 + 2.45 Time 116468
```

APPENDIX D

Study Screener

Responsible Investigator(s): Lydia M. Karlowicz
Title of Protocol: Performing Multiple Tasks on a Web Page

Respondent Number: _____

Thanks for your interest in participating in my thesis research. I need to ask you a few questions to make sure that you fit the subject profile for the study.

1) (RECORD GENDER; DO NOT READ)
    a. Male
    b. Female

2) Which of the following age ranges best describes your age?
    a. Under 25 Yrs. (TERMINATE)
    b. 25 – 40 Yrs.
    c. 41 – 50 Yrs.
    d. Above 51 Yrs. (TERMINATE)

3) Do you have normal or corrected vision?
    a. Yes
    b. No (TERMINATE)

4) Do you use a computer with Internet access at:
    a. Home
    b. Work
    c. Both
    d. Neither (TERMINATE)

5) How many hours per week do you spend on the Internet (at home and work combined)?
    a. 0 – 4 hours/week (TERMINATE)
    b. 5 – 9 hours/week
    c. 10 – 14 hours/week
    d. 15 hours +/week

6) What kinds of personal interest and work related topics do you look up on the Internet?

7) Name any sites that you regularly visit

8) How long have you been using the Internet (including using e-mail, browsing, FTP, etc.)?

   a. Less than 6 months (TERMINATE)
   b. 6 to 12 months (TERMINATE)
   c. 1 to 3 years
   d. 4 to 6 years
   e. 7 years or more

9) Have you done any of the following on the Internet in the last year? (TERMINATE if items 1 and 2 are not checked off)

   - ❑ Purchased an item from a Web site by filling out an outline form.
   - ❑ Searched for a topic using a search engine (e.g. Yahoo, Infoseek, Altavista, etc.)
   - ❑ Created a Web page
   - ❑ Customized a Web page for yourself (e.g. My Yahoo, CNN Custom)
   - ❑ Changed your browser's "cookie" preferences
   - ❑ Participated in an online chat or discussion (not including e-mail)
   - ❑ Listened to a radio broadcast online
   - ❑ Made a telephone call online
   - ❑ Used a nationwide directory to find an address or telephone number

10) How often do you purchase items online?
   a. Never (TERMINATE)
   b. More than once
   c. Once a month
   d. Once a week

APPENDIX E

Study Debriefing and Instructions Script

Responsible Investigator(s): Lydia M. Karlowicz
Title of Protocol: Performing Multiple Tasks on a Web Page

Study Introduction

(This will be read by the investigator to each subject before the experiment. Instructions for the investigator appear in italics and parentheses.)

First of all, I want to thank you for coming in today, and helping me with my research.. What you'll be doing is helping me measure the performance of multiple tasks on a Web-site.

- First I'm going to inform you about what we will be doing today. Then I will ask you to read and sign a consent form. After that, I will give you instructions on what to do, and have you perform some exercises on the PC. When you're done with the exercises, I'm going to ask you some questions about your experience. Finally, I will give you a full debriefing about the study.
- I'm going to ask that you pay close attention to the instructions that I am going to give you because during the study, I will not be able to talk to you or answer any questions you may have because it will affect the outcome of the study. I will be more than happy to answer any of your questions after you complete all of the exercises.
- I need your complete attention to the exercises so that I can collect accurate data for this study. I ask that if at all possible, you complete all of the exercises in this session without interruption. If for any reason you cannot complete them, i.e., you feel ill, are uncomfortable, or need to leave for any reason we can stop the study. You will not be penalized for not completing the study session.
- I want to make sure it is very clear that I am not testing your knowledge or skills in this study so please don't feel uncomfortable while performing the tasks. Just try to do them to the best of your ability. Also, I'll be sitting right next to you while you are completing the exercises, but I'm just here as a proctor. I'm not evaluating your performance in any way. The application that you'll be using today will record all the data.
- At the end of the study, I will have you complete a survey to gather feedback about your overall experience during the study. Some of those questions will be based on a rating scale. When you give your ratings, make sure you give

them based on your experience during the study and not on how you feel others may think about the experience. I need your reactions.

- Any questions? (Investigator: Answer any questions the subject has, then continue.)
- Next, I'd like to ask you to sign the agreement to participate form. *(Investigator: read aloud all points in the document, and ask them to sign it.)* You are free to refrain from agreeing and signing this document if you feel compelled to do so. Doing so will mean that you won't be able to participate in this study. Please remember that you will not be penalized in any way for not completing this study session.

Pre-Study Instructions

(This will be read to each subject before they perform the tasks. The investigator will show the subject an example of each page while giving these instructions. Cues for the Investigator appear in italics in parentheses.)

- You are going to perform 7 exercises in total. We'll take a short break in between each exercise.
- Each exercise will ask you to view a search results page and select the search results that best match what you were asked to find. This home page *(Investigator: show the study home page printout with links to each exercise)* has a link to each search results exercise. When you open to this page, I will tell you which exercise to click on.
- When you click on an exercise, *(Investigator: show the instruction page example)* you will see a question. This is the information that you will be looking for in the search results. I'd like you to read it out loud. If the question is at all unclear, please let me know. Once you have read and understood the question, click the Start link.
- One the search results page *(Investigator: show the search results page example and point out each element as you talk about it.)* you will perform two tasks:
    - There will be a list of search results. They are not in any specific order. You're going to go through each search result and check the boxed next to the ones that best answer the exercise question – that is, you want to check the results that would most likely lead you to the answer. Make sure that when you check the box, there is actually a checkmark there. Feel free to uncheck a box if you feel you made a mistake.
    - There will also be a stock ticker on the page that is changing on a regular basis – just as a normal stock ticker does. At the same time that you are selecting the appropriate search results, you will watch the Dow Jones Industrial Average and click the "It's Up" button every time the average goes up. Try you best to perform both tasks at the same time while doing your best to select the most appropriate search results.

    - When you are done selecting the search results on the page, click the "Done with Search Results" button at the bottom of the search results section. Then click the "Go to the Next Exercise" button in the right corner. This will take you to the home page.
    - Then I'll time the break with a stopwatch before we go to the next exercise.
    - We're measuring both speed and accuracy on the search results task so try to select the best search results as quickly as you can.
- We're going to start with a practice exercise so you can get accustomed to performing these two tasks. Just relax and do your best. *(Investigator: make sure the subject is looking at the Study Home Page on the computer, and say...)* OK, begin.
- *(At the end of the practice trial, ask...)* OK, was that clear? Do you have any questions? *(Investigator: answer subjects questions without biasing them in any way.)* OK, begin the next exercise.
- *(Investigator: when the subject clicks Done, say...)* OK, let's take a one-minute break.
- *(Investigator: at the end of break, say...)* OK, begin the next exercise.

APPENDIX F

Agreement to Participate in Research

Responsible Investigator(s): Lydia M. Karlowicz
Title of Protocol: Performing Multiple Tasks on a Web Page

1. You have been asked to participate in a research study investigating the performance of multiple tasks on a Web page.

2. You will be asked to select appropriate search results on a Web page while monitoring an additional display on the Web page for changing information. The study session will take approximately 30 minutes of your time at the RelayHealth offices in Emeryville, CA. You will be asked to perform the tasks on a PC (personal computer) that will be provided at the study location, and to answer interview questions asked by the Investigator. You will not be directly identified with any data collected from this study.

3. No risks to you are anticipated from your participation in this study.

4. You will receive no direct benefits, monetary or otherwise, from participating in this study. The indirect benefits of general feelings of reward from being of help to research are possible.

5. There is no compensation for participation in this study.

6. Although the results of this study may be published, no information that could identify you will be included.

7. Questions about this research may be addressed to Lydia M. Karlowicz (510) 428 – 7823. Complaints about the research may be presented to Dr. Kevin Corker, Director of the Graduate Program in Human Factors and Ergonomics, (408) 924 – 3988. Questions about research subjects' rights, or research-related injury may be presented to Nabil Ibrahim, Ph.D., Associate Vice President, Graduate Studies and Research, at (408) 924-2480.

8. No service of any kind, to which you are otherwise entitled, will be lost of jeopardized if you choose to "not participate" in the study.

9. Your consent is being given voluntarily. You may refuse to participate n the entire study or in any part of the study. If you decide to participate in the study, you are free to withdraw at any time without any negative effect on your relations with San Jose State University or with any other participating institutions or agencies.

10. At the time that you sign this consent form, you will receive a copy of it for your records, signed and dated by the investigator.

- **The signature of the subject on this document indicates agreement to participate in the study.**

- **The signature of the researcher on this document indicates agreement to include the above named subject in the research and attestation that the subject has been fully informed of his or her rights.**

_____ _____

Signature Date

_____ _____

Investigator's Signature Date

APPENDIX G

Post-Study Questionnaire

Responsible Investigator(s): Lydia M. Karlowicz
Title of Protocol: Performing Multiple Tasks on a Web Page

Instructions: Please answer each of the following questions in the spaces provided.

1. What did you like **best** about the search results page you used today? Please briefly describe the top 2 – 3 things that were most appealing.

2. What did you like **least** about the search results page you used today? Please briefly describe the top 2 – 3 things that were least appealing.

3. How difficult or easy was it to perform both tasks? (Circle your choice below.)

Extremely Difficult	Very Difficult	Somewhat Difficult	Average	Somewhat Easy	Very Easy	Extremely Easy
1	2	3	4	5	6	7

Why?

4. How did you feel about the ad at the top of the screen? (Circle your choice below.)

Extremely Disliked it	Very Much Disliked it	Somewhat Disliked it	Average	Somewhat Liked it	Very Much Liked it	Extremely Liked it
1	2	3	4	5	6	7

Why?

5. How do you feel about banner ads on Web pages in general? (Circle your choice below.)

Extremely Dislike Them	Very Much Disliked Them	Somewhat Disliked Then	Average	Somewhat Like Them	Very Much Like Them	Extremely Like Them
1	2	3	4	5	6	7

Why?

6. How do you feel about blinking banner ads on Web pages in general? (Circle your choice below.)

Extremely Dislike Them	Very Much Disliked Them	Somewhat Disliked Then	Average	Somewhat Like Them	Very Much Like Them	Extremely Like Them
1	2	3	4	5	6	7

Why?

7. What do you normally do when you are presented with a banner ad that is blinking or animated?

APPENDIX H

Debriefing Statement

Thank you for participating in this research study.

When you were asked to participate in this study, you were told that the study was about measuring the performance of multiple tasks on a Web page. What was actually measured was the effect of the blinking ad on the performance of those tasks. You weren't told of this at the beginning of the study because it would have possibly affected the study results.

When you leave the study session, I ask that you do not mention this or any aspects of the study to anyone else. Other employees at RelayHealth are participating as subjects in this study and their knowledge of the true purpose and details of the study may affect the study results.

If you wish, you may receive a copy of this study when they are published. The target date for publication is August 2003. Please contact Lydia Karlowicz at 510-428-7823 for a copy.

Please sign this disclosure below to acknowledge that you have received and understand this information. You will receive a copy of this document for your records.

- **The signature of a subject on this document indicates attestation that the subject has been fully debriefed about the purpose of the study.**

- **The signature of the researcher on this document indicates attestation that the subject has been fully debriefed about the purpose of the study.**

_____ _____

Signature Date

_____ _____

Investigator's Signature Date

APPENDIX I

IRB Approval Letter

San José State
UNIVERSITY

Office of the Academic Vice President
Academic Vice President Graduate Studies and Research
One Washington Square
San José, CA 95192-0025
Voice: 408-283-7500
Fax: 408-924-2477
E-mail: gradstudies@sjsu.edu
http://www.sjsu.edu

To: Lydia M. Karlowicz
1170 Foster City Blvd., #313
Foster City, CA 94404

From: Nabil Ibrahim,
AVP, Graduate Studies & Research

Date: May 15, 2003

The Human Subjects-Institutional Review Board has approved your request to use human subjects in the study entitled:

"The Effect of Blink on Attention Capture in Web-Based Design."

This approval is contingent upon the subjects participating in your research project being appropriately protected from risk. This includes the protection of the anonymity of the subjects' identity when they participate in your research project, and with regard to any and all data that may be collected from the subjects. The approval includes continued monitoring of your research by the Board to assure that the subjects are being adequately and properly protected from such risks. If at any time a subject becomes injured or complains of injury, you must notify Nabil Ibrahim, Ph.D. immediately. Injury includes but is not limited to bodily harm, psychological trauma, and release of potentially damaging personal information. This approval for the human subjects portion of your project is in effect for one year, and data collection beyond May 15, 2004 requires an extension request.

Please also be advised that all subjects need to be fully informed and aware that their participation in your research project is voluntary, and that he or she may withdraw from the project at any time. Further, a subject's participation, refusal to participate, or withdrawal will not affect any services that the subject is receiving or will receive at the institution in which the research is being conducted.

If you have any questions, please contact me at (408) 924-2480.